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**APRIL
1956**

Feature

**Scientific Management
in the Chemical Corps
By Major General Creasy**

On The Cover

William Murlin Creasy, in 1922, entered the U.S. Military Academy, from which he was graduated and commissioned a second lieutenant in the Air Service June 12, 1926.

In May 1948, General Creasy was appointed chief of the Research and Engineering Division of the Chemical Corps. In October 1951, he assumed command of the newly created Chemical Corps Research and Engineering Command and of the Army Chemical Center.

On May 8, 1954, General Creasy became Chief Chemical Officer, U. S. Army.

General Creasy has been awarded the Distinguished Service Medal, Legion of Merit, Bronze Star Medal, and Army Commendation Ribbon.

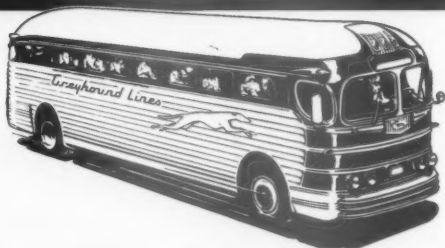
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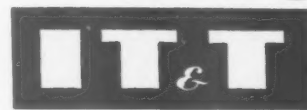
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APRIL, 1956

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COAST GUARD
MARINES

MANAGEMENT

Volume 2

APRIL, 1956

Number 7

Features

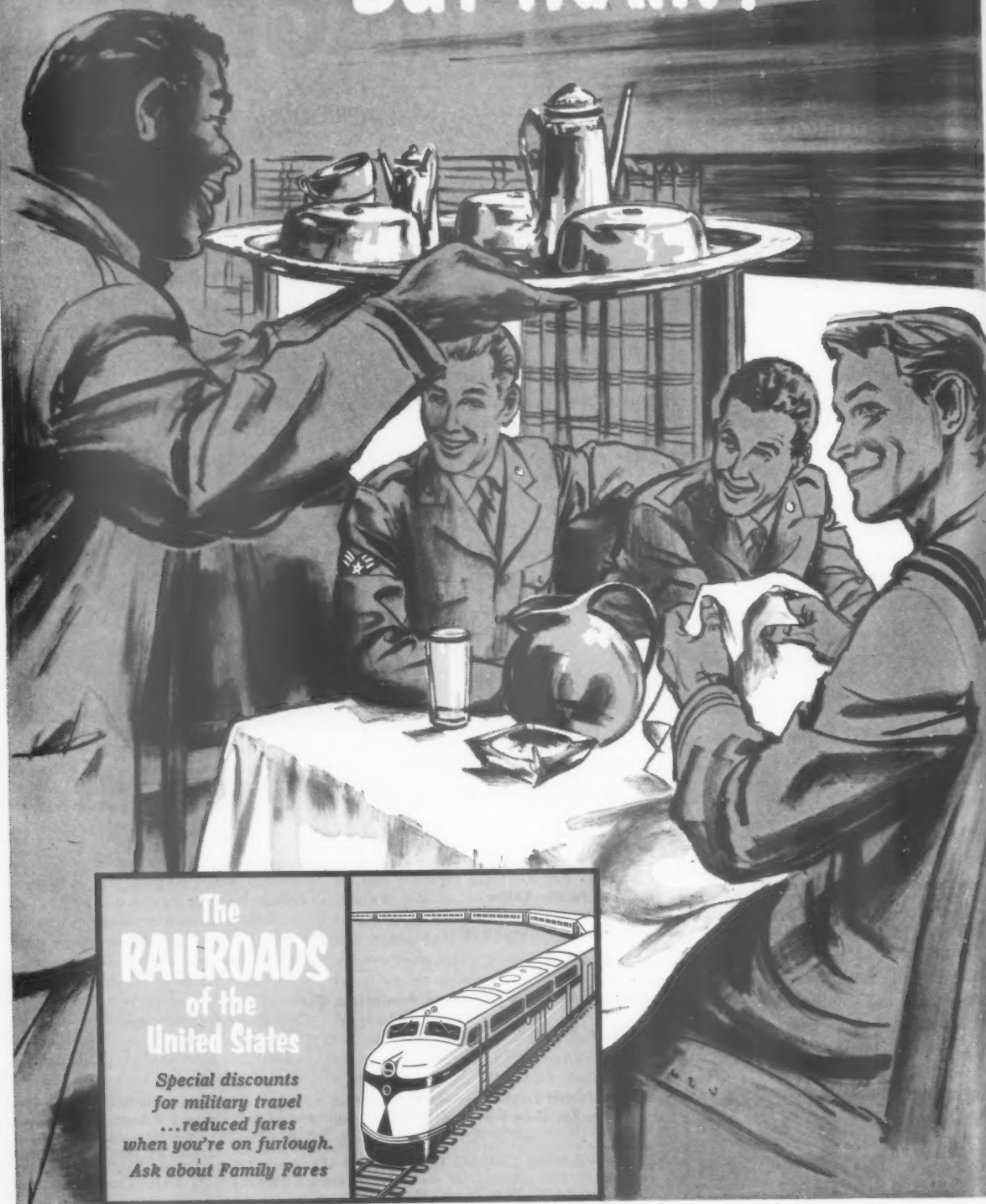
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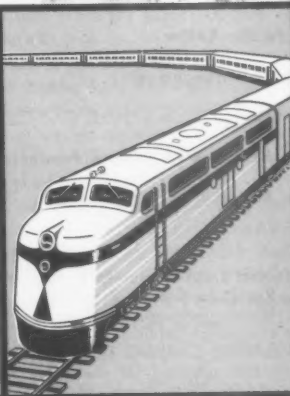
ARMED FORCES MANAGEMENT is published monthly by the Professional Services Publishing Company, Roy B. Southworth, President. Editorial and Business Office, 208 South Second Street, Rockford, Illinois. Publication office, 404 N. Wesley Ave., Mount Morris, Ill. Accepted as controlled circulation publication at Mount Morris, Illinois. Copyright 1956 by the Professional Services Publishing Company. Title registered, U.S. Patent Office. Six weeks notice before next publication date required for change of address. SUBSCRIPTION RATE: One Year—\$3.50; Two Years—\$6.00; Three Years—\$8.00.

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By Major General William M. Creasy
Chief Chemical Officer, Army



Scientific Management in the Chemical Corps

IT IS WIDELY recognized throughout American industry today that the application of sound management principles and procedures is indispensable to all types of industrial operations. In research laboratories, in production plants and in advertising and sales, we find engineering management, executive development and organizational analysis of major concern to those responsible for the successful conduct and growth of the company. Particularly during the past ten years we have seen an industrial revolution—not so much in machine development as in thought development. The good executive is well aware of the increasing complexity of his responsibilities and the increasing scope and impact of managerial decisions. He is no longer merely a manipulator of labor but a developer of personnel, a coordinator of functions and a supervisor of operations.

The phenomenal growth of American industry since the start of the century is a concrete tribute to the ability of the industrial leaders of the past. Our productivity per worker has shown an amazing rise during the past thirty years, and today with approximately one-fifteenth of the world's population we are producing close to one-half of the world's goods. However, despite this

remarkable record of achievement, the leaders of the past would be the first to admit that the principles of operation they used are as obsolete as the surrey with the fringe on top. There is no comparable period in American history when management has been faced with such a rapidly changing industrial and social environment. Changing population and age patterns are throwing more and more tasks on a workforce that is a smaller percentage of the total population than ever before. In 20 years the percentage of our population of those over 65 and under 21 years of age will have increased by one-third. Further, the average American will never be satisfied with his standard of living, and we shall have to increase the output per worker more than in the past to keep abreast with the demand.

What I have said above about American industry applies with equal force to the operation of the vast complex of military agencies. Each of the technical services of the Department of the Army—the various bureaus, departments and laboratories of the Navy—the several commands and directorates of the Air Force, each of these is equivalent to a major industrial organization. The problems of effective organization, executive development and efficient operation are even more

vital to the military than they are to the industrialist, for the fate of the nation depends in the final analysis on our ability to solve these problems aggressively and intelligently. Hence it should occasion little surprise to know that we have been deeply interested in all phases of scientific management and that we are continuously introducing new techniques and procedures to improve our operations. I believe it will be of interest to present briefly what is our concept of scientific management and just how we have introduced this concept into Chemical Corps operations.

There is no simple definition of scientific management, and it can best be defined by a delineation of functions. Basically, we must realize that management is an activity in itself, and that it requires certain basic attitudes, concepts and qualifications. Specific managerial skills and tools which are common requirements at all levels of executive responsibility must be identified and defined. Such skills and tools must be woven into a practical formula so that the basic principles may be applied to the solution of management problems. Assuming

New Recording Machine Division Set Up by Dictaphone

A separate Recording Machine Division has just been established by Dictaphone Corporation, pioneer and largest manufacturer of dictating machines.

Dictaphone Corporation has long been active in the design, manufacture and sale of specialized recording machines for monitoring and logging telephone, radio and live communications. Dictaphone recording machines, recording upon such media as plastic belts, magnetic belts and magnetic tape, are widely used here and abroad by Government, business and industry. A few of their specific applications include recording of air traffic control communications, fire, police and emergency alarms, radio monitoring, inventory-taking.

The corporation expects considerable expansion in its recording machine business as a result of this new division and the many new developments it is working on in the field of specialized recording.

that this groundwork has been established, then management consists essentially of (1) executive development; (2) organization building; (3) planning, integrating, directing and controlling; (4) evaluating, appraising.

I have deliberately placed executive development first since I am convinced that the planned development of management personnel is one of the most important factors in assuring the successful future of an enterprise, an organization or a program. Because of its importance and scope, the remainder of this article will be devoted to this subject.

Throughout America today—in industry, government and even in the university—developing executive personnel is of the greatest concern to high level management. Hundreds of companies and establishments are using various techniques aimed at improving the abilities of managers and executives, and we are all familiar with the devices of job rotation, appraisal systems, psychological counseling, school assignments, group discussions, supervisor coaching, and so forth. In the Chemical Corps we are using all of the sound methods to insure a continuous supply of capable executives for high level positions.

Our problem is complicated by the fact that we must deal with both military and civilian personnel. Even though the same fundamentals apply equally to both groups, the military man has the additional responsibility of undergoing his military training and developing his competence in military matters. Since this aspect of our problem is of limited interest outside of the armed services, I shall not dwell on it further here. However, I do want to emphasize that, to the greatest extent possible, we include both the civilian and the military in our program of executive development.

Our basic objectives in management personnel development are simple and almost obvious:

1. To improve performance of operations.
2. To increase the capacity of managerial personnel for additional responsibilities and increasing complexity of operations.

3. To provide opportunity for individual growth and self expression; to produce leaders.

4. To insure that management practices are modern and progressive.

5. To establish the basic principle that executive development cannot be left to chance, but must be scientifically planned and aggressively executed.

For the purpose of this discussion, Chemical Corps operations—and their magnitude may be judged by a yearly budget of more than 100 million dollars—may be divided into research and development, engineering and production. In each of these areas we use the management tools for personnel development which best give us the results we require. Conferences and seminars are among the most effective mechanisms for positive development. Meetings may deal with such topics as technical procedures, program development, work simplification, policy and doctrine and job evaluation. Such conferences insure that the skill and experience of the supervisors are transmitted to others by the exchange of ideas among all attending the conference. In our research and development organization particularly, the conference method is used widely and frequently. At the higher levels, weekly staff conferences are standard, and similar discussion groups can be found among the laboratory personnel and scientific investigators at the bench level. We have found that these conferences serve a three-fold purpose: the first is solution of the specific problem scheduled for discussion; the second is development of the younger individuals through active participation in the give and take of an informal conference; the third, stimulation of all concerned by the interchange of thoughts and ideas. Under such stimulus, I have frequently seen a man develop amazingly fast from one of few words and fewer ideas to a very valuable and productive member of the team. An additional benefit is obtained in the case of the more formal and lengthy seminars by assigning to the younger people responsibility for organizing and supervising the conduct of the various meetings making up the semi-

nar. Our tripartite conferences, held annually with the United Kingdom and Canada, are good examples of this. Here the research and development accomplishments of the three countries in our field are discussed and evaluated, and plans for the future are agreed upon. It is a most broadening experience to be assigned to the secretariat for the conference or to be charged with responsibility for the technical discussions of a major segment of the program. I know of no case in which the man chosen for the job—and the organization—did not profit to a major degree by such assignment.

Another mechanism which we believe offers much promise for executive development is individual instruction by a supervisor or by an immediate superior. This method can be the most effective of all, but it requires that personnel at all levels of the organization are sensitive to their management responsibilities and capable of discharging them. This is not easy to assure; many highly capable people are frequently egocentric to the point that they cannot project themselves toward the individual members of their teams or groups. They may be very capable as organizers, operators, and planners but in human relations and personal dealings they may have serious failings. It is of the utmost importance that these failings be eliminated since the single most important resource of an organization is the plexus of skills, experience and abilities of its members. And the most effective method of developing similar qualities is by personal counseling, direct relations and specific coaching. Such activity must be established as an integral and continuing part of a supervisors' duties at all levels. Hence, a vital part of our management program is to impress upon all our people that this function—call it coaching, teaching, guiding—is most compelling to our future welfare.

At the same time that we emphasize this responsibility of each supervisor, we place an equal responsibility on the individuals being developed. In the final analysis, people cannot really be developed; they must be encouraged and persuaded to develop themselves. It is our responsibility to make available

the tools for development and to establish a climate conducive to personnel improvement and advancement. Under such circumstances, the man with the required potential will voluntarily—and aggressively—avail himself of the opportunities afforded.

It may be said that a managerial job is a composite of the subordinate jobs in the entire organization. Hence, planned job rotation is used to prepare the potential man to become a manager. Similarly special work assignments, to solve an immediate problem or to accomplish a crash program are of particular value in developing the ability to analyze, perform and evaluate.

I shall mention without elaboration a few other techniques which we have found of assistance:

1. *Reading the literature:* Today there is a vast amount of published information on scientific management. We encourage our people to interest themselves in current thought on this subject; our libraries contain the latest books and periodicals on all aspects of organization and management.

2. *Membership in professional and technical societies:* Membership in such societies and attendance at meetings will inevitably result in increased competence and enlarged perspective. To the maximum extent we encourage such membership and support participation in the agenda of the meetings.

3. *In-service training:* Courses on college and graduate level are offered at a number of Chemical Corps installations. These are supervised by a recognized university and credit toward the bachelor's, master's and Ph.D. degree is awarded. The value of this practice for personnel development, morale and public relations is obvious.

4. *Extra-mural training:* Personnel are sent to such institutions as Harvard University, the Wharton School, M.I.T., University of Wisconsin, George Washington University, Stanford, for work in business management, chemical engineering, biological sciences and other subjects of interest to the men and of value to our work. Because of the time and expense involved, the number involved here is necessarily small, but this is an integral part of our career management program.

RCA To Market Special Laboratory Apparatus for Electronics Research

Precision electronic test apparatus that facilitates the design, development and production of complex electronic equipment and systems will be placed on the market within the next thirty days by the Radio Corporation of America, it was announced today by Arthur L. Malcarney, General Manager, RCA Commercial Electronic Products.

Introduction of thirteen different instruments, Mr. Malcarney said, will mark RCA's full-scale entry into the field of electronic test equipment for industrial and laboratory applications.

RCA will sell the new test apparatus nationally and will appoint manufacturers' representatives or distributors of industrial electronic equipment in each major market area. Additional instruments and equipment developed and planned by RCA for this specialized market also will be offered through these channels.

More extensive use is made of short-term courses and seminars similar to the workshop type offered by the American Management Association.

There are other methods used to develop management personnel, but I believe I have discussed the more important ones. In any event, they are the ones which we have found most effective and which are the foundations of our management program.

Like most large organizations—both civilian and military—the Chemical Corps until recently had no planned development program. Although many of the mechanisms mentioned above were used, there was no systematic procedure to insure their application throughout the entire structure. Each supervisor used what appealed to him, and the depth and breadth of use depended on his personal inclinations. Frequently, a heavy work load, a personal bias or plain ignorance conspired to produce a total disregard of sound principles. Just as frequently, a lack of understanding or over-enthusiasm for something new generated absurd situations where scientific management

was proposed as the panacea for all our ills—in research, in engineering and in manufacturing and supply. Obviously such a situation, once recognized, cannot endure, and concurrent with the extensive reorganization of the Chemical Corps during the past year, a planned management development program for the entire Corps has been established.

First and foremost has been the enunciation on the highest level of a clearly defined management development program. The fundamental principles, objectives and methods of operation have been collated and disseminated to all elements of the Corps. This has been accomplished by our newly-formed Career Management Division in the Office of the Chief Chemical Officer. It is the primary responsibility of this division to design and organize an executive development program and to insure that it is integrated into the day-to-day operations throughout the organization. This division must see that partici-

pation in the program by executive and supervisory personnel at all levels is sincere and thorough, and it must inculcate the principle that development training is a major concern of each member of the organization, both subjectively and objectively. To assist in effecting this, career management offices have been formed in all operating elements of the Corps, and we have a direct line relationship on management principles, techniques and operations among these offices and the Career Management Division.

I should like to mention two actions we have taken to help build a sound base for management development. The first is the introduction of a three-week course in management into the curriculum of the Advanced Course at the Chemical Corps School. The management portion has been developed by the major commanders, and staff officers of the Chemical Corps with advice and counsel of Dean Joe L. Jessup, who is the Coordinator of the Air Forces Resources Manage-

ment Program at George Washington University. This Chemical Corps program includes the basic principles of sound organization and staff relationships; planning and control; financial management; and evaluation and appraisal. I believe that making the study of management an integral part of this course will have a three-fold purpose: it will impress on the present and future executives of the Corps the basic importance of the subject; it will familiarize them with the technical information available on the subject; and it will assist in evolving a corpus of knowledge on the subject specifically tailored to Chemical Corps needs and requirements.

The second action was the conduct of a 3 day management seminar in February 1956, sponsored jointly by the Chemical Corps Materiel Command, the Career Management Division, OCCm10, and the Chemical Corps Training Command. Several recognized leaders in the fields of industry, government and education appeared on the program. The seminar was attended by more than a hundred executives and supervisors. Its objectives were: "To re-acquaint the participants with the principles of management, organization, human relations and communications, and the values which can be secured from their application to his daily work.

"To arouse the desire for self development and to provide avenues by which it can be accomplished.

"To develop a dynamic interest in providing the necessary leadership needed to encourage others to develop their management capabilities."

The seminar was eminently successful and was received by the participants with the greatest enthusiasm. In fact before it had ended requests were being received that similar conferences be scheduled for the research and development people and for the Engineering Command. I visualize management seminars of this nature annually or bi-annually in each major segment of the Corps. And I also visualize the participants—and they will range from commanders of major installations with thousands of employees to supervisors with three and four people—return-

Mexican Industrial Directory Now Available

The third edition of an enlarged FIRST NATIONAL INDUSTRIAL DIRECTORY OF MEXICO, compiled by the Confederation of the Chambers of Industry of the Republic of Mexico and edited and published by Rolland Publications, is now available for immediate delivery.

Such has been the expansion of industry and commerce in Mexico, second only to Canada in the importation of United States' products on this continent, that three revised volumes, instead of the previous two, are needed to list all of Mexico's companies and their data. The price, however, remains at \$21.50 (U.S. currency) prepaid to any part of the United States.

Volume I not only lists the more than 50,000 recognized companies in Mexico, but also supplies such essential data as:

Addresses, phone numbers and cities of firms; line of business; name of manager; whether firm is manufacture, distributor, importer, exporter, wholesaler, etc.; a registered trademark directory; trade association firm is affiliated with; and declared capital of firm.

Volumes II and III, similar to the Thomas' Register, breaks Mexico's products down into approximately 32,000 categories and arranges them into alphabetical order with the approximately 180,000 suppliers listed under the products. Not only do these two volumes enable you to select the firm best suited for your needs with the minimum of time and effort, but they also offer an invaluable mailing list.

American businessmen who have already discovered the lucrative opportunities in Mexico, have found this well organized, up-to-date industrial directive indispensable. It is an ideal reference for imaginative businessmen who are interested in creating new markets for their products in a growing and vigorous industrial development.

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ing to their commands and offices and scheduling similar conferences on their levels or below, so that the principles and techniques for executive development will be disseminated throughout the entire structure.

Basic to what we are attempting to achieve are the principles that trained and effective manpower is an organization's most valuable asset, and that manpower development is a primary responsibility of good management. When these principles are clearly recognized and when they are reflected throughout the operations of an organization, then there need be no further concern over its soundness and success. This, in brief, is our primary objective in the Chemical Corps.

IBM "Brane" to be installed on Boeing B-52 Stratofortress

A new bombing and navigational system of unprecedented reliability developed by International Business Machines Corporation will be installed in the Boeing B-52 Stratofortress. The B-52 is the biggest, fastest bomber employed by the Strategic Air Command.

Announcement that the Boeing B-52 will be equipped with IBM-built "seeing eyes" was made by Thomas J. Watson, Jr., president. Mr. Watson stated that the system will be called BRANE (Bombing Radar Navigation Equipment). Expansion of IBM facilities by construction of a 400,000 sq. ft. plant at Owego, New York, is expected to speed up production.

The new system was originally conceived by the Air Force's Air Research and Development Command at Baltimore, Mr. Watson said. He thanked ARDC and its Commander, Lieutenant General Thomas S. Power, for their constant support.

The new high-performance B-52 is now in the inventory of the Strategic Air Command. The BRANE is built to assist the B-52 crew in doing bombing and navigation problems under the most strenuous conditions. The crew employs the navigation equipment to guide the plane to its destination. Then the system automatically carries the plane through the bomb

run, responding to corrections made by the bombardier-navigator, who controls the equipment. Exact operational details are restricted by military security. Research is continuing to keep the system abreast of rapid advances in supersonic warplane design.

The extraordinary reliability of BRANE is largely due to the development of new, long-lasting electronic and mechanical components. The remarkable flexibility of the system permits its adaptation for use in other advanced bombing planes.

Mr. Watson stated that "Boeing engineers of course coordinated installation of the BRANE in the B-52 and their fine job reduced considerably the installation time. The wholehearted cooperation of Boeing personnel has been most helpful in completing the installation and tests. During testing operations the excellent performance of the Boeing B-52 has contributed to the accelerated Flight Test Program."

To instruct Air Force personnel in the capabilities and maintenance of BRANE, IBM is conducting a series of courses at its Airborne Computer Laboratories at Vestal, New York. The education program developed at Vestal will be continued at SAC bases. IBM is also turning out handbooks on the operation and maintenance of the system, and additional literature to make up complete training courses. In addition, the company has undertaken a complete spare parts program, so that SAC bases will be well supplied for emergencies.

Future Bosses

Recent survey by American Management Association indicates business firms are placing great emphasis on development of future executives. Of companies queried, 54 per cent have systematic plans for leadership development, 21 per cent have designated persons to guide promising employees, and 13 per cent said the problem was getting special attention. Trend is apparently new, because 80 per cent of programs have been in effect less than ten years.

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Organization of the Coast Guard

General. The internal organization of the Coast Guard is designed not only to fit the normal operational functions and activities of the Service, but also recognizes the dual status, under which it operates under the Treasury Department in time of peace and within the Navy Department in time of war or national emergency. In carrying out its responsibilities in the fields of maritime safety, maritime law enforcement and military readiness the Coast Guard is directed and supervised by the Commandant from his Headquarters in Washington. This is done through twelve district commanders who direct and administer all Coast Guard operations within a given geographical area and through a number of independent units which report directly to Washington. In addition two area commanders, one on the west coast and one on the east coast direct certain operations involving more than one district within the area.

Headquarters. The Commandant directs the policy, legislation and administration of the Service under the general supervision of the Secretary of the Treasury.

The Assistant Commandant assists the Commandant in the general administration of the Coast Guard and acts as Commandant in the absence of the latter. He takes action on matters not requiring personal attention of the Commandant and assures coordination between the several offices and independent divisions composing Headquarters organization.

The Chief of Staff coordinates program development and exercises general management and policy control for the Commandant within the Service at large.

The Office of Comptroller has staff responsibility for logistics that involve maintenance of accounts, disbursement of funds, audit and examination of accounts, the preparation, presentation and administration of the budget, the recording and analysis of costs, the provision of statistical services and the efficiency of the supply program including the procurement, storage and distribution of equipment, supplies and services.

The Office of Engineering has staff responsibility for logistics that are of an engineering character, including the design, construction, repair, maintenance, outfitting and alteration of vessels, aircraft, aids to navigation, shore establishment, machinery, electronics equipment and utilities.

The Office of Merchant Marine Safety has staff responsibility for the program for prevention of marine casualties, including the inspection of merchant vessels to assure compliance with established standards, approval of vessel plans and equipment, and the development and application of standards for merchant marine personnel.

The Office of Operation has staff responsibility for the operational adequacy of the Service in connection with the saving of life and property at sea and otherwise, the provision of aids to navigation, maritime law and enforcement and general military readiness.

The Office of Personnel has staff responsibility for logistics that are of a personnel nature, including the procurement, training, assignment and separation of personnel, the provision of medical and morale services, and the administration of the programs for the Coast Guard Reserve and the Coast Guard Auxiliary.

In addition to the major components above, the inspection and public information divisions perform special staff functions for the Commandant directly. Special advisory bodies (the Merchant Marine Council, the Chief Hearing Examiner and the Chief Counsel) perform specific tasks in the field implied by their titles and advise the Commandant.

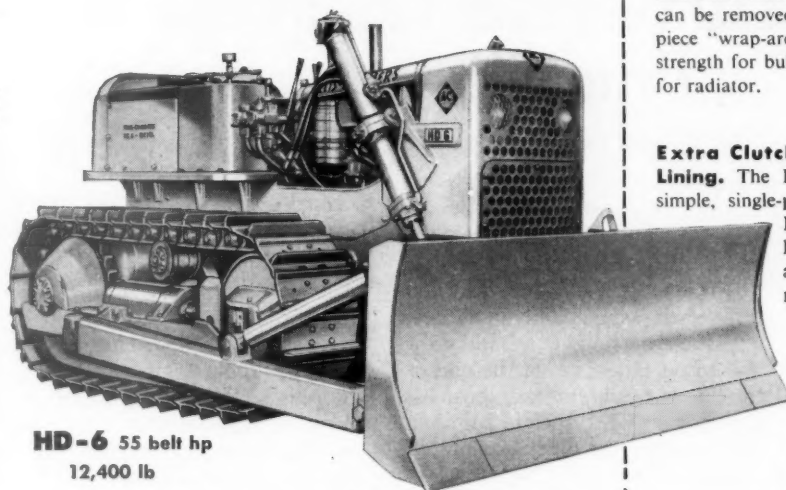
Certain field units are under the direct control of the Commandant, rather than under district commanders, due to their unique function in the Service, or to their geographical location. Some of these are the Coast Guard Yard, for construction and repair of ships and boats, the Aircraft Repair and Supply Base, Merchant Marine Details overseas, the Supply Center and the Receiving Center for recruit training.

Area Offices. Two area offices have been established. Eastern area comprises the districts on the east coast, the Gulf Coast, the Great Lakes and the Mississippi River system. Western area comprises the districts on the west coast, Alaska and Hawaii. Area commanders, with a small immediate staff, exercise operational control over Coast Guard districts within their areas for operations requiring a high degree of coordination between two or more districts within the area. Area commanders also have responsibility for directing a program aimed toward the maintenance of a high degree of operational readiness of Service units. For the purpose of operations requiring the intervention of an area commander, the district commander is under the operational control of the area commander concerned.

District Offices. The geographical area of operations of the Coast Guard both in the United States and overseas is divided into twelve districts each under the command of a District Commander. The office of the district commander is patterned closely after that of Headquarters, and includes engineering, comptroller, operations, merchant marine safety and personnel divisions. The district commander directs and administers all Coast Guard units within the boundaries of his district except as heretofore mentioned.

District Units. The functions of the Coast Guard are carried out by district units which are the ships; aircraft; air, light, radio, and lifeboat stations; marine inspection offices and logistic units such as bases, depots and repair shops assigned to districts. District units are generally under the direct operational and administrative control of the district commander. In some instances, a number of units are organized into a group under a group commander who in turn reports to the district commander.

This kind of Crawler Tractor Design is just right for Military Service



HD-6 55 belt hp
12,400 lb

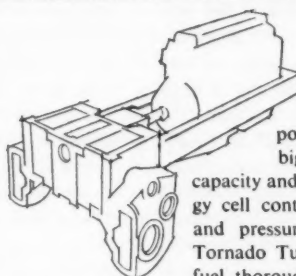
... and only Allis-Chalmers HD-6 has it—
advanced design features that
combine big performance,
versatility, dependability and
simplified servicing!

Look at the Allis-Chalmers HD-6—you can see its functional design . . . how it's built to give sure-footed traction, better working balance. But there's more to this crawler tractor than meets the eye—the performance advantages of Allis-Chalmers advanced basic design. It provides more working power, more strength in all components, more working weight where it's needed . . . makes the HD-6 an outstanding performer with drawn or mounted equipment . . . easier to operate and maintain.

Write for details and specifications on the HD-6. Also ask about the three new, larger sizes of Allis-Chalmers tractors. Like the HD-6, their new standards of dependability make them ideal for military use where dependability means so much.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION
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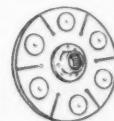
Allis-Chalmers Heavy-Duty Diesel Engine.

The HD-6 power plant is designed for big output, ample reserve capacity and low maintenance. Energy cell controls combustion timing and pressures for high efficiency. Tornado Turbulence mixes air and fuel thoroughly for more complete

burning. Follow-Through combustion sustains effective working pressures to take advantage of better crankshaft leverage.

Special Strength and Protection. Exclusive all-steel box-A main frame makes possible superior over-all balance, better equipment mounting . . . plus service simplicity of unit construction. Major assemblies like engine and clutch can be removed without disturbing adjacent parts. One-piece "wrap-around" radiator guard provides maximum strength for bulldozer mounting . . . complete protection for radiator.

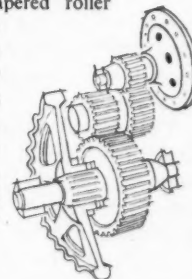
Extra Clutch Life—with Ceramic Lining. The HD-6 master clutch offers simple, single-plate, over-center design.



Revolutionary new ceramic button clutch lining keeps clutch operating longer between adjustments . . . lengthens clutch life . . . reduces lever pull for easier operation.

Straddle-Mounted Final Drive Gears. Tapered roller bearings support both ends of the final drive gear shafts. Smaller gears

and shorter shafts (plus line-bored, one-piece case), provide better bearing and gear alignment, more strength, longer life. Double-reduction final drives provide greater ground clearance.



New-Design, Heavy-Duty Track.

HD-6 track provides long life under the toughest conditions. HD-6 sidebars have more steel where it's needed . . . benefit from new heat-treating methods which make possible new standards of strength and hardness throughout for extra wearability.

Other Outstanding HD-6 Features

. . . no other tractor in this size class has them—at no extra cost you get roller bearing truck wheels, idlers and support rollers; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; 24-volt direct electric starting; crankcase guard; bumper; and lights.

(Let us recall the highlights of the preceding three parts: Organizers and managers are forced to be empirics because neither a theory nor a systematized body of knowledge is available to them. Organizations are therefore built and operated upon a structure of personal relations with an underlying paternalism in control; this is in conflict with a primary basic sentiment of American culture—freedom from a *personal* authority which can be arbitrary and dictatorial; and because of this conflict (and other related conflicts) only a small part of the potential energy of the individual is released into organizational productivity. The past

and present approaches to a theory of organization try to build on concepts of the relativity of man, with individual man as the basic unit of structure; but man's relativity to man is subjective and unstable. This article proposed that *idea* be the basic unit, and that a theory of relativity of ideas would have the requisite objectivity and stability. By *pneumagenesis* a generation of ideas was accomplished to provide the skeletal structure of the organization; we had formed one type *Atomos*—the basic unit of organization (comparable to the cell in organisms and the atom in matter); and we were ready to form the type *Atomoi*.)



ORGANIZATION—From Empiricism to Principle

By Colonel Leland B. Kuhre

Chapter Four

For the structure of the *Atomoi*, we have to go back to the *pneumagenesis* (Figure No. 4) where we found that the end-of-the-line had been reached. We recall that one of the indicators was the appearance of a casual or open structure. We then identified the *Pneuma* as *Pneuma_n* leaving the incomplete structure of lesser included ideas for future reference. It is now time to use them;

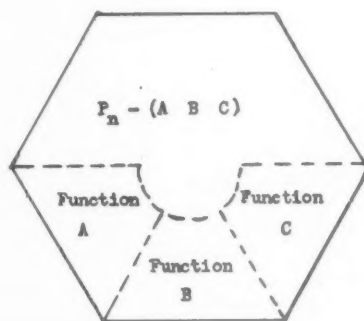
The lesser included ideas are "functions"; this is the first and only time we use this term. They are functions because no one of them is a whole idea of accomplishment in itself. We recall the analogy of the organism and its functions (respiratory, circulatory, nervous, muscular)

Let us assume that functions "A", "B", and "C", were identified at the end-of-the-line in the *pneumagenesis*. Then the *Atomos_n* would be designed as shown in Figure No. 7.

We note in Figure No. 7 that the functions A, B, and C do not add up to the whole *Pneuma_n*. The part left over is indicated by the expression $P_n - (A+B+C)$. To aid in visualizing this, let us assume we are going to form a *Team_n* by embodying the ideas in the *Atomos_n* in people. The *Team_n* would consist of a Leader, and three assistant Leaders: one for *doing* A, one for *doing* B and one for *doing* C. The

Leader_n *does* what is left over [$P_n - (A+B+C)$] plus the coordination of his assistants. In practice this *Team_n* is the crew or equivalent term such as machine gun crew, airplane crew, engine rebuild crew, and so on. The term at the end-of-the-line varies in military, business, government and social. In social organizations the term "committee" is generally used.

We now have the complete organizational structure in terms of its basic unit—the *Atomos*. (Figure No. 8).



LEGEND:

Whole Hexagon—Symbol for *Pneuma_n*
Function—Identifiable (but not separable) act of "doing" appropriate to one mind to perform the act.
A, B, C—Specific identified functions—illustrative only

THE ATOMOS_n

(Formed from any *Pneuma_n*)
(Showing idea relativity)

Figure No. 7

Starting at the top of Figure No. 8, let us see what the *Atomoi* actually do. *Atomos₁* obviously does not convert its *Pneuma₁* into the corresponding act of accomplishment. It does not *do* it; it can only "see to the doing" (to again oversimplify). We proceed to each *Atomos₂*; it is the same here; it does not transform its *Pneuma₂* into the act of accomplishment. *Atomoi₂* does not *do*; it can only "see to the doing." And so on, it is the same with *Atomoi₃*, *Atomoi₄*, *Atomoi_{n-1}*.

Since all the *Atomoi* above *Atomoi_n* *do* the same thing, then what they do can be expressed in a formula applicable to all of them. For the same reason, all of the *Atomoi* above *Atomoi_n* can be considered as one type; and we can designate them as *Atomoi_i*. Thus the relativity of any *Atomos* in the *Mechos₁* can be expressed by a subscript. For example: we can call any *Atomos* an *Atomos_x*. Then the *Atomos* next above it is *Atomos_{x+1}*; coordinate (same level) *Atomoi* are *Atomoi_x*; and the *Atomoi* next below are *Atomoi_{x-1}*. To further illustrate—let us assume "x" is "3." Then *Atomos₃* has an *Atomos₂* next above it, other *Atomoi₃* coordinate to it, and *Atomoi₄* next below it. To think of an organizational structure in this terminology has many advantages that I am sure are obvious to

one who has been faced with the problem of terminology to pinpoint specific groups.

Later, when we embody the ideas in the Atomos in people, we should note how the structure sets the stage perfectly for group identification, membership in a specific group, a common purpose for the group, and the many allied elements that are so important today in the creation and distribution of human satisfactions to *every individual* in the entire organization.

The formula for any Atomos_x is the result of much experimental verification to develop it, and then much testing to prove it. The first hypothesis for the formula was found to be too narrow, primarily because it would not give complete ideas when pneumagenesis was applied to generate the complete six-part statement ideas within the Atomos. The following formula has been widely tested and proven in practice: (of course the idea language is changed when the idea structure is embodied in people to energize the ideas).

who: Atomos_x
 what: discharges its responsibility for Pneuma_x
 where: in Mechos(x-1)
 when: continually
 how: by—

- 1) producing formal acts of:
 assigning current Pneumina(x+1) to Atomoi(x+1)
 coordinating the execution of Pneumina(x+1)
 combining the results of execution to produce Pneuma_x
 developing cooperative interests in Mechos(x-1)
 representing Mechos_x
- 2) developing an informal flow of information, advice and technique (in support of the five formal acts above) to Atomos (x-1), other Atomoi_x, and Atomoi(x+1)
- 3) developing appropriate fields of technology and ontology in Mechos_x by using one or both of (1) and (2) above to improve the organizational body as a whole.

why: in order to most effectively accomplish Pneuma(x-1)

("DOING") MISSION OF ANY ATOMOS_x

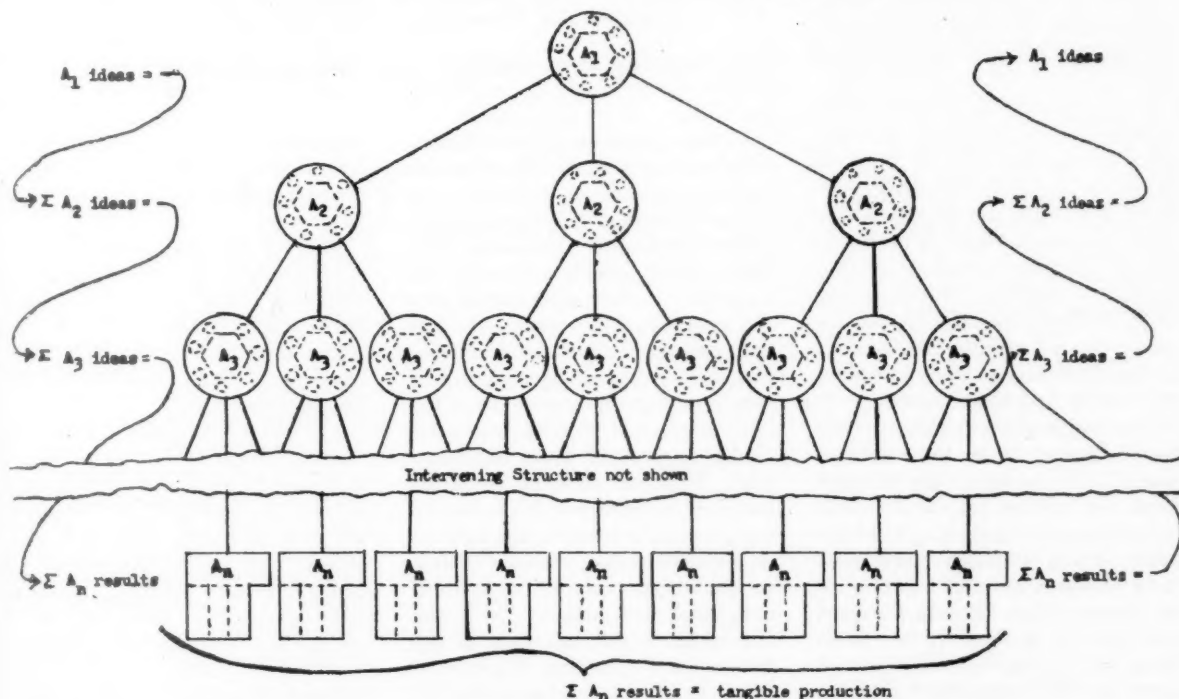
Figure No. 9

Similarly, all of the Atomoi_n are the same in *doing* their respective Pneumina_n. Thus we have:

who: Atomos_n
 what: discharges its responsibility for Pneuma_n
 where: in Mechos(n-1)
 when: as Pneuma_n requires
 how: by doing it
 why: in order to most effectively accomplish Pneuma(n-1)

("DOING") MISSION OF ANY ATOMOS_n

Figure No. 10



LEGEND:
 A—Atomos (whole figure inside solid lines)
 Σ—Summation of
 THE ATOMOS STRUCTURE
 (Idea Structure of Entire Organization)
 Figure No. 8

At this point we should clarify the difference between the term "Pneuma" and "Mission." The Pneuma still has its same meaning, but we had to have a name for the six-part idea that tells what an Atomos *does*. Here the term "mission" in general usage seems suitable, provided we understand that it is always the six-part idea telling what the Atomos (and later the individual) *does* as opposed to the Pneuma for which the Atomos is *responsible*.

Now the entire structure (Figure No. 8) is composed of specific small groups (Atomoi). Each Atomos as a group of ideas knows what it is responsible for (its Pneuma), and each Atomos as a group of ideas knows what it does to discharge its responsibility (formula mission). Further, each Atomos has a "right" relativity to every other Atomos and to the whole structure. But we still have to complete the design of the internal structure of the Atomoi, so as to give complete clarity to each idea in them.

To design the internal structure of an Atomos, we use pneumagenesis again.

Referring back to Figure No. 4, let us place the type mission for any Atomos (Figure No. 9) on the left.

Next we select the key. Here the requirements underlying the concept of the Atomos, as a single entity or "institutional mind" prevents its separation into separate parts, just as the mind of man cannot be split into separate smaller minds to function independently of each other. Thus the key in this case is the *contribution* to be made to the Atomos, for an end-product to come out of the Atomos.

The partitioned structure of this key is made up of the "thought levels" in a Pneuma. The thought levels we use are empirical (without independent theoretical derivation) as yet, although there must be a theoretical basis waiting to be found. The "structure" from the "key" is in three parts: Basic Policy, Complementary Policy, and Specialty. The summation of these three (by construction) is the whole of any Atomos end-product—anything "leaving" the Atomos.

Inserting the "structure" back in the type mission (Figure No. 9)

we generate three formula missions internal to the Atomos. For space conservation we show them below together, but this has an advantage of conveying the impression of the summation of the three producing the whole:

Basic Policy Idea in the Atomos_x

who: *Complementary Policy Idea in the Atomos_x*
Specialty Idea in the Atomos_x

what: discharges its responsibility for Pneuma_x

where: in Mechos_(x-1)

when: continually

how: by—

basic policy

- 1) contributing *complementary policy* to the Atomos_x for *specialty*

formal Atomos_x end-product acts of:

assigning current Pneumina_(x+1) to Atomoi_(x+1)

coordinating the execution of Pneumina_(x+1)

combining the results of execution to produce Pneuma_x

developing cooperative interests in Mechos_(x-1)

representing Mechos_x

- 2) developing an informal counterpart channel flow of information, advice, and technique (in support of the five formal acts above) to counterparts in Atomos_(x-1), other Atomoi_x, and Atomoi_(x+1) as appropriate.

- 3) developing (*insert appropriate field(s) of technology or ontology*) in Mechos_x by using either one or both of (1) and (2) above to improve the organizational body as a whole.

why: in order to most effectively accomplish Pneuma_(x-1).

NOTE: The three type missions are identical except for substitution of corresponding terms in the "what" and in the "how".

THE THREE TYPE ("DOING") MISSIONS WITHIN ANY ATOMOS_x

Figure No. 11

Of the above three type missions, (Figure No. 11), only the specialty mission is further generated by pneumagenesis into lesser included whole missions. Obviously, the basic policy mission cannot be generated further; and neither can the complementary policy be further generated. In the further generation of the specialty mission, the "key" is the specialty, and the "structure" is the next lesser included specialized fields of knowledge. When the items in the structure are substituted back in the type specialty mission (Specialty₁) we have Specialty₂ missions. This is sometimes carried out to Specialties₃ and Specialties₄ . . . The Specialty_n is the last step in the generation whether it be at Specialty_{1, 2, 3, 4} . . . (Figure No. 12)

Each Specialty has the same type formula mission, varying only in what specialty is being contributed to the Atomos. The full development of a large specialty (say

around 100 positions) exceeds our space available. In essence, we start with the specialty mission in the same general way we started with Pneuma₁ and follow the same general steps up to this point. Mrs. Ruby Freeman of the Granite City

Engineer Depot, on her own initiative, accomplished this whole design for a specialist group of about 90 people.

The Complementary Policy mission cannot be generated into lesser included whole missions without destroying the concept of the Atomos, yet in an Atomos_x the idea of complementary policy is too big for one mind.

The lesser included ideas of Complementary Policy must be determined in such a way that they are not independent and separate, and yet in such a way that they *always* add up to the whole of Complementary Policy. Furthermore, and this is *most important*, when ideas come into the Atomos_x, the affinity of the ideas to the lesser included ideas of Complementary Policy must be distinctly different from the affinity that draws the same situation or problem to a Specialty in the Atomos. If these two affinities are not distinctly

different, we will get into a never ending conflict between the specialist and the generalist.

In the Army this conflict has been with us since the inception of the general staff¹⁷ and there still appears to be no solution in sight.

The Army is not alone in this; it is present in any organization where generalists are conceived in terms of functions reporting to the top authority. The titles vary; sometimes they are Assistant Chiefs, sometimes Vice Presidents, sometimes Deputy Chiefs of Staff, sometimes Assistant Chiefs of Staff; but they are always in charge of some function to hamper them as generalists and put them in conflict with specialists. The E. I. duPont de Nemours & Company solved this problem, apparently, by keeping the members of their Executive Committee free from any tie to an operating function; and thus they have the closest approach to the generalist that has come to my attention.¹⁸

There are two more key observations (about the generalist being conceived in terms of functions) which we need to have in mind before we can return to the problem of designing the lesser included ideas of Complementary Policy in the Atomos_x. But before we proceed further let us be certain that we have a specific meaning for the term "function" as we are using it here.

When we think of "functions" we are thinking of the problem areas of most immediate concern to the head of the organization (commander, president, chief, and so on); they are usually identified on charts in the row of blocks just below the head. There appears to be no common basis for the design of these functions; they are different in pattern according to the purpose of the organization and the personal ideas of the head; hence they defy the formulation of an adequate generalization or definition. Let us therefore look at a few examples to

illustrate the meaning: In the military services we find functions like personnel, supply, operations, communications, logistics, intelligence, administration, and so on. In business we find functions like research, finance, manufacturing, accounting, selling, legal, and so on. In government, the boxes just below the chief in the many departments are specialized; it is impracticable to select illustrative functions for our purposes here except, perhaps, the function of administration.

The second key observation (about the generalist being conceived in terms of functions) is that the vice president, assistant chief, assistant chief of staff "in charge of (a function)" must make the success of his function primary; and so it follows that he will want to have under him everything he can get that is related to his function. He seems to have a greater claim on some specialists than others, and they are grouped under him. Thus the specialist is subordinated; he loses his rightful supremacy in his field; he loses his rightful freedom to contribute his specialty wherever it may be required; and he finds himself neatly blocked out of the play.

The third observation about the functional executive has to do with the same force that causes the above situation with respect to the specialist: The functional executive must (to be a personal success) make his function successful in the opinion of his superiors. Thus he is caused to extend himself down into the organization below wherever and whenever there is anything going on that relates to his function. The resulting entanglement with other functions (doing the same thing) is painfully obvious to anyone who views it looking up the structure. Perhaps the most clear cut example of this appeared when Great Britain designed the organizational structure for its Nationalized Coal Industry established by the Coal Industry Nationalization Act of 1946. At the top eight functions were designed for embodiment in functional executives of varied titles. The functions extended down the structure to the end-of-the-line. "The result has been that the Area General Managers and the Colliery Managers—

the men responsible for getting the coal out day by day—have been 'serving half a dozen masters' and have been 'overwhelmed by central instructions, and at the same time have been dependent on remote central decisions on matters affecting their own local responsibilities'."¹⁹

During the period 1945-1949, the problem of the functional executive position was a key obstacle to the proper design of the Atomos_x. It was obvious on every hand that a functional basis for the design was an error. There had to be a new approach, a new basis, and a different concept common to all organizations for human enterprise.

An examination of the Pneuma structure showed that all ideas of accomplishment were generated out of a Pneuma_x to form the Pneumina_{x+1}; and hence there were none left in the corresponding Atomos_x. Hence it followed that *there could be no functions in an Atomos_x*.

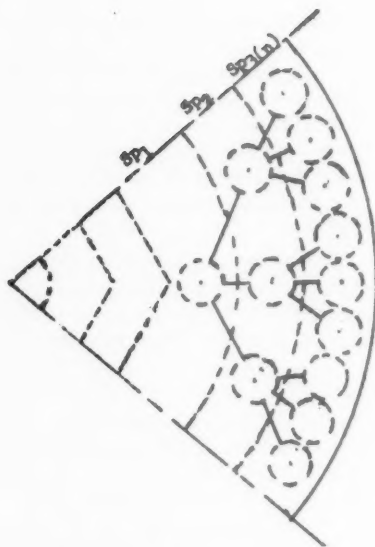
An examination of the Atomos_x concept showed that all fields of knowledge in technology and ontology were located in the specialties extruded within the Atomos_x and thus there could not be a duplication of these ideas in any way within the nucleus. (Figure No. 6). Further, the specialty must be free to be supreme in its field within the Atomos_x, to contribute the specialty wherever and whenever it is needed. Thus, fields of knowledge could not be the basis for the design of the lesser included ideas of Complementary Policy (executive positions).

Since, within the Atomos_x, the specialties were extruded from the nucleus, then it followed that specialties could not be located within the nucleus (Figure No. 6); and thus within the nucleus we could have only generalities (embodied in generalists). Having generalities, it followed that the positions must be such that the embodiment of them (generalists) could be interchangeable. And since the true generalist thinks and acts in terms of the whole organization and the whole situation, the positions must

¹⁹Loucks and Hoot, *Comparative Economic Systems*, Harper and Brothers, New York, Fourth Edition, 1952. p. 381

¹⁷Otto L. Nelson, *The National Security and The General Staff*, A. S. Barnes, New York 1952

¹⁸*Management by Executive Committee*, Harvard Business Review, May-June 1955, p. 51



SEGMENT OF AN ATOMOS.*

to show
ILLUSTRATIVE SPECIALTY STRUCTURE
resulting from
Pneumagnosis (three stages) to the end-of-
the-line specialty.

* See Figure No. 6
Figure No. 12

be designed so as to cause such thinking and acting.

With the above preliminary analysis as a starting point, certain requirements for a solution were formulated: All situations and problems coming into the Atomos, must flow automatically (by idea affinity) to an executive position. The affinity of a situation or problem for an executive position must be *completely* different from the affinity of the same problem or situation for a specialty. There must be an automatic *dual* affinity of a situation or problem at the moment of entry into the Atomos,—one to the executive position for cognizance, and one to the specialty for action. There must be no temptation or cause for specialties to be continually grouped or compartmented under any generality (executive position).

From 1945 until 1949 many different approaches were tried hoping that they would lead to a solution. In early 1949, a search for some analogy to aid in the solution led to thinking about the *general* situation of the organism and its *general* problems of continually adjusting itself to its environment. This continual adjustment to environment is a major concern (and seemingly the whole purpose) of

the organism, and unless it is successful in the adjustment it is eventually doomed to extinction. Alfred North Whitehead made the analogy to organizations for human enterprise in his Lowell Lectures of 1925 when he said, "A factory . . . is an organism exhibiting a variety of vivid values. What we want to train is the habit of apprehending such an organism in its completeness."²⁰

Several tentative hypotheses were formulated in early 1949 to express the problem of an organization's adjustment to its environment in a general way so as to be common to all organizations, and so there could be a built in "habit of apprehending (the organization) in its completeness." Finally, the relationships of an organization in its environment were conceived to be six—six sets of relationships that were common to all organizations and that would be applicable to any organization for any purpose. From this concept an hypothesis was formulated and put into experimental verification in operating organizations in 1949. Lacking enough variety in "laboratories," abstract verifications were made in every conceivable type and variety of organization by studying the charts and the descriptions of them and then visualizing them in operation. After some adjustments, a theory of the design of the lesser included ideas of Complementary Policy (executive positions) was formulated. The first full scale test of the theory in application occurred during the "Granite City Test."

During the development of the above concept of the need for the organization to continually maintain itself in state of harmonious adjustment in its relationships in its environment, the results of failures to do so could be seen on every hand. In business we had the period of not giving enough attention to relationships with the public. In the supporting services in the Armed Forces could be seen the effect of not giving enough attention to relationships with the recipients of service and supply. In combat organizations could be seen

the effect of inadequate attention to relationships with coordinate organizations (supporting and flank) and with sources (of supply). Colonel S. L. A. Marshall, in his on-the-ground study of combat operations in World War II places much emphasis on the need for cognizance of relationships with sources (incoming supply as he puts it), with coordinate organizations (support) and with coordinate organizations (on the flanks).²¹

That the design of our combat organizations in the Army does not have a built in cognizance of these sets of relationships is highlighted by one example:

" . . . it has been the practice in many of our tactical units simply to assign the maintenance of contact to whatever individual happens to be deployed on the far flank. I have seen, advancing in line, regiments which committed this difficult mission to the flank companies, which in turn committed it to the leaders of their flank squads, with the almost invariable result that contact failed in the crisis of action. One can hardly imagine a greater carelessness in battle procedure."²²

Still apropos of adjustment to environment in combat organizations, Colonel Marshall cites the "counsel insistently given by Major General Stuart Heintzelman, Major General Frank A. Ross, and others: "Anticipation is 60 per cent of the art of command," and then comments in the following words: "But like ten years in the penitentiary, it is very easy to say: 'Anticipate!' and very hard to do it."²³ With a designed and built in continuing and trained cognizance of all the relationships involved in adjustment to environment, automatic "anticipation" appears; and a very valuable device it must be if it is 60 per cent of the art of command. It is significant that during the "Granite City Test" a careful check was maintained on the effectiveness of the anticipation and concurrently on the effectiveness of the prevention of surprise; and during the

²¹Colonel S. L. A. Marshall, op. cit., pp. 188-191

²²Colonel S. L. A. Marshall, op. cit., p. 191

²³Colonel S. L. A. Marshall, op. cit., p. 187

²⁰Alfred North Whitehead, *Science and the Modern World*, New American Library, New York, 1953, p. 200

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two year period of the test there was not one instance of Atomos₁ (in embodiment, Team₁) being surprised by even a minor administrative situation.

(In the next installment we shall complete the idea structure of Complementary Policy — executive group; and we shall also complete the internal idea structure of the type Atomos₁. We shall see how, from the designed idea structure, we build the organization by giving each of the ideas to a person to energize; and this will be illustrated in photographs of actual organizations so constructed in the "Granite City Test".)

Continued Next Month

Hercules Transport Receives Underwater Test

An exhaustive hydrostatic (underwater) test program is being conducted on the U. S. Air Force C-130 Hercules prop-jet transport at Marietta, Ga., the Air Force and Lockheed disclosed today.

One reason for the testing program—which is similar to that per-

formed on the British-made Comet jet transport—is that the turbo-prop Hercules flies at high altitudes and its entire fuselage is pressurized and air-conditioned. The new airlift giant has a 3,680-cu.-ft. main cargo compartment which is longer and wider than a standard freight car.

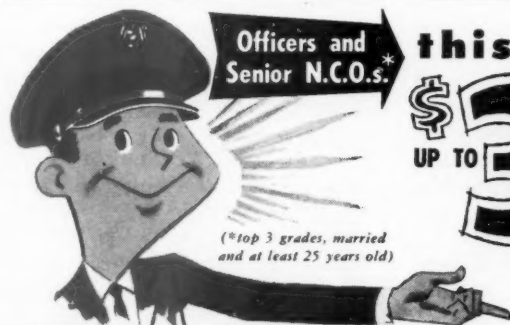
To test the cavernous C-130 for "pressure fatigue," it will be immersed in a T-shaped, 100-ft.-long tank and 25,000 flights will be simulated. These tests will reproduce the stresses and strains imposed on an aircraft during flight and will represent several "lifetimes" of operation. The repeated pressurization and depressurization of the fuselage, as the plane climbs to cruising altitudes and descends for landings during thousands of flights, fatigues the metal to a slight degree wherever the metal "works" under operational loads.

A simple example of this fatigue is when a wire breaks under repeated bendings. Engineers are thoroughly familiar with this phenomenon and they design airplane structures, insofar as possible, to minimize such fatigue. However,

heavy loads, high altitudes and high speeds—all notable features of the C-130's performance—will subject the workhorse aircraft to fatigue over a long period of time. Engineers feel that 25,000 cycles of the "repeated loads tests" will conclusively prove the lifetime integrity of the Hercules.

A major advantage of the immersion-type testing is its economy. A concrete pool was built for static testing at a cost of approximately \$20,000. This pool was used for a series of tests on the aft and nose sections of the C-130. Engineers say these tests saved an estimated \$300,000 to \$500,000.

Chicago's Mayor Richard J. Daley is introducing something new in municipal government—a "city hall on wheels" . . . Daley or one of his top aides will cruise the Windy City's streets in a station wagon every weekday to give citizens the chance to voice complaints or suggest improvements in city administration . . . The station wagon will be equipped with a two-way telephone to permit Chicagoans to phone in their gripes.



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1. Additional operators under age 25 in household at present time:

Age	Relation	Marital Status	No. of Children	% of Use

2. (a) Days per week auto driven to work? _____ One way distance is _____ miles.

(b) Is car used in any occupation or business? (Excluding to and from work) ☐ Yes ☐ No

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Conservation through Suggestions

Fort Benning, Georgia. Five civilian employees and two military personnel were recently presented with cash awards and letters of commendation by Brigadier General Ernest A. Barlow, The Infantry Center's deputy commanding general, for job improvement suggestions. Mrs. Tressie H. Dees, Louis C. Ballou, Francis X. Barron, Carl M. McDonald, SFC Reg. Bayone-Sanderson and SFC John C. Knight, were the recipients.

United States Coast Guard, Washington, D.C. The efficiency of Coast Guard aircraft has been considerably improved through the adoption of a suggestion submitted by Glenn W. Daniel, an electronics mechanic at the Coast Guard Aircraft Repair and Supply Base. His proposal, concerning the modification of aircraft homing equipment, is expected to result in annual savings of \$10,000. Intangible benefits in the form of improved operation of the electronic homing device as well as conservation of critical space and weight aboard the aircraft are important by-products of Mr. Daniel's money saving suggestion. This high caliber idea brought the suggester an award of \$395 and a letter of commendation from Vice Admiral A. C. Richmond, Commandant, U.S. Coast Guard.

Headquarters Ordnance Weapons Command, Rock Island, Illinois. Brigadier General T. A. Weyher, Commanding General, Ordnance Weapons Command, recently presented a \$290 suggestion award check to Mrs. Rubv R. Cook, Field Service Division. The award was based on savings in the processing of "Equipment on Hand Requisitions", which resulted in an estimated first year savings of \$12,926.00.

Just prior to this award, Mrs. Cook was presented a \$100 sugges-

tion award check for improvement in processing MDAP Maintenance Spare Parts Demand with an estimated annual savings of \$2,850.00.

Reese Air Force Base, Lubbock, Texas. A management improvement suggestion made early in 1954 recently won an additional cash award of \$150 for Ewing K. Irwin. Mr. Irwin worked out a landing wheel modification for T-28 type aircraft and in September 1954, was given \$216 for the idea which saved the Base more than \$7500 annually. Last year the T-28's were removed from the Reese training program, however the Commander of the Flying Training Air Force on approving the suggestion for wider use, added another \$150 to Irwin after it was determined that monetary savings in the command amounted to \$17,025.25. Mr. Ellis D. Brewer received a check for \$70 together with a letter of appreciation signed by the base commander for his suggestion "sealing of landing gear warning switches."

Oakland Navy Supply Center, Oakland, California. By winning Navy-wide adoption of a streamlined warehousing operation, the Oakland Navy Supply Center has saved the Navy millions of dollars annually.

This was revealed Nov. 21, when Rear Adm. Charles G. DeKay, commanding officer, presented a \$650 superior achievement award check to center employment superintendent Richard A. Maher for his part in achieving the new Navy concept.

The award to Maher and smaller awards to 17 other employees who worked with him, climaxed a four year battle for adoption of a new "warehouseman" job classification in Navy supply activities. Installation of the new rating at the Supply

Center in 1953 produced actual first-year savings on the Oakland base alone of some \$1,090,000 according to RADM DeKay.

The Navy's Bureau of Supplies and Accounts is now compiling similar savings figures at other Navy supply installations. Meanwhile, the only available estimates place Navy-wide savings at "several million dollars."

Headquarters Seventh Air Force (6th Troop Carrier Squadron), APO 915, San Francisco. A C-124 loading dolly designed by T/Sgt. James E. Stewart, is realizing labor savings of approximately \$1,000 each month to the squadron. Additional savings of \$39,000 per year to replace aircraft flooring damaged through the former push and slide method of loading are also being realized, together with more effective use of available cargo space.

Headquarters Sixth Army, Presidio of San Francisco. Specialist Third Class Wendell Kopf, an IBM trained service engineer, received recently a Department of the Army citation for his suggestion to save an hour and a half work a day and increase the efficiency of key punch operators by 15 per cent. Colonel R. S. Nourse, Sixth Army Adjutant General, made the presentation.

U. S. Naval Air Station, Pensacola, Florida. Twenty-five O&R department employees were presented with a total of \$370 in checks for Beneficial Suggestions recently by Commander L. J. Hunt, USN. The suggestions too numerous to mention in this issue, comprised savings throughout the department.

Headquarters Brooklyn Army Terminal, New York. Mr. Frank Wachs, Chief of the Civilian Personnel Division, was recently presented with a Certificate of Achievement and congratulations from Colonel Robert C. Hanes, Commanding Officer, BAT, at a surprise ceremony commemorating the anniversary of his 25 years of Government service.

Utah General Depot, Ogden, Utah. Mr. Dan J. Torghelle in the Provost Marshal's office is wealthier

by \$200 a letter continu perform years. M employe 1950.

Elect quartet Great J tronic S establish ing Ber to winn and act 1955.

At a Captain Supply Officer, tion rate the prec cent par of the p with th around there w suggesti in 1954 had a v

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Sewell T USN, F Officer. sugges awarded and rece mander Corps, U Lieuten Maiden, Officer.

by \$200 today, and is the holder of a letter of commendation for his continuous sustained superior work performance for more than two years. Mr. Torghele has been an employee of UGD since November 1950.

Electronics Supply Office, Headquarters, Ninth Naval District, Great Lakes, Illinois. The Electronic Supply Office, Great Lakes, established a precedent of awarding Beneficial Suggestion Plaques to winning divisions for a vigorous and active suggestion program in 1955.

At a recent award ceremony, Captain Leland P. Kimball, Jr., Supply Corps, USN, Commanding Officer, stated that ESO's participation rate more than doubled that of the preceding year, with a 60.6 percent participation rate. The quality of the program has been sustained, with the adoption rate remaining around 26 percent. This means that there were twice as many adopted suggestions in 1955 as there were in 1954 and twice as many people had a voice in ESO's operations.

Captain Kimball presented two beneficial suggestion plaques to the winning divisions, one for suggestion program excellence and the other for the largest increase in participation. Accepting the award for program excellence on behalf of his division was Commander



Sewell T. Kauffman, Supply Corps, USN, Financial Control Division Officer. The trophy for increased suggestion participation was awarded to the Catalog Division and received by Lieutenant Commander James D. Wilson, Supply Corps, USN, Division Officer, and Lieutenant Commander Robert W. Maiden, who was former Division Officer.

After presenting the plaques, Captain Kimball concluded:

"The interest and initiative displayed by the divisions have greatly benefited the Electronic Supply Office, and have given real impetus to the Beneficial Suggestion Program. Let me remind all of you that these are traveling awards, and that every division has an equal chance, regardless of size, to win one for 1956, by increasing its participation in the program, and by striving to improve the quality of suggestions, so that more may be adopted. The Beneficial Suggestion Program is an excellent way for you, the employee, to share in the management of ESO."

Scott Air Force Base, Illinois. M/Sgt. Royal Z. Stanton, sergeant major of the 2469th Air Reserve Flying Center, recently received a letter of commendation from Tenth Air Force Commander, Major General Robert E. L. Eaton, USAF, for a suggestion to provide space at the end of each series of publications listed in AF Regulation 5-2 for the entry of temporary record of related material as current AF Regulations are received.

Headquarters Third Army, Fort McPherson, Georgia. Five hundred and three "better" operational ideas saved Third Army installations, covering seven Southeastern States, an estimated \$353,789, during 1955; and paid the suggestors each bonuses of \$10,905.

Civilian employees sent in 1054 suggestions; 572 were accepted. Military persons sent in 543 ideas, of which 131 were put to use. Military personnel are not eligible for cash awards.

The largest single cash award, \$385, went to Mr. Augustus E. McPhaul of Fort Rucker, Alabama, for suggesting the use of a mechanical mixer for mixing large amounts of chemicals used in fighting insects and rodents. One hundred dollars of the \$385 came from Department of the Army, as Mr. McPhaul's idea was adopted for Army-wide use.

Military Sea Transportation Service PAC, Seattle, Washington. Mr. Edward C. Glimpse received \$75 recently for a suggestion of a new method of starting lifeboat engines

which involves use of a charged capsule to discharge highly volatile ether into the intake manifold of lifeboat diesel engines. The priming insures quick starting in almost any condition of weather or temperature. Rear Admiral Henry S. Persons, PAC Commander, presented the award to Mr. Glimpse in a ceremony at the area headquarters.

Charleston Air Force Base, South Carolina. A check for \$250 payable to Mr. Ralph E. Thornhill, civilian aircraft mechanic, for three suggestions in speeding up repair of aircraft fuel tanks, convinced Thornhill and his fellow-employees that the Base Suggestion Program was a worthwhile plan.

White Sands Proving Ground, New Mexico. Suggestions made by civilian and military personnel during the last quarter effected savings to the Department of the Army of more than \$30,000. This is almost three times the amount saved during the previous quarter—\$11,413. Monetary awards given for ideas during the high quarter were \$630 in comparison to \$405 for the past quarter of the year.

Headquarters Fifth Army, Chicago, Illinois. Lieutenant General William H. Arnold, Fifth Army Commander, in a personal letter recently to all subordinate commanders, urged for an even better incentive program. He reported that savings from ideas put into effect during the past six months had yielded savings in excess of \$101,000. General Arnold advised that on inspection trips and other visits to field installations, headquarters staff officers will give particular attention to steps being taken in encouragement of accelerated military and civilian employee participation in the program.

The Population Reference Bureau, one of the agencies which keeps tabs on the nation's growth, thinks American life may be well on the way to being "controlled" by females . . . The bureau says that the proportion of women in the U.S. has been increasing since 1900 and they're steadily expanding their influence in terms of politics and ownership of property.



NEWS BRIEFS

from the

SERVICES

Headquarters Sixth Army, Presidio of San Francisco, California. The Honorable Chester R. Davis, Assistant Secretary of the Army for Financial Management, and Lieutenant General Laurin L. Williams, Comptroller of the Army, were recent visitors at Sixth Army. Conferences were scheduled with top-ranking officers on a new program designed to increase efficiency and save money known as the Army Command Management System. Under the system, control of operating costs is given directly to the commander responsible for making operating decisions. The program has been installed at the Presidio of San Francisco and in the California Military District.

Alaska District, Corps of Engineers, Anchorage, Alaska. Colonel Carl Y. Farrell, Alaska District Engineer, U.S. Army Corps of Engineers, recently bid farewell to Mr. William S. Brix, Chief of the District's Management Branch, who has transferred to the San Francisco District. A citation reading in part, "For unusual ability in the field of management, and a large cake baked for the occasion, completed the ceremony. Brix is succeeded by Mr. Alexander L. Brown, who has been with the Corps for over 14 years.

General Stores Supply Office, Department of the Navy, Philadelphia, Pennsylvania. Colorful ceremonies were recently held in Philadelphia on the occasion of Captain John Webber Crumpacker, USN, Commanding Officer of the General Stores Supply Office, promotion to Rear Admiral. Admiral Crumpacker who has commanded this installation for more than a year, was prior to this assignment, Commanding Officer of the Naval Supply Depot in Seattle, Washington.

Headquarters Air Materiel Command, Wright-Patterson AFB, Ohio. Major General David H. Baker, USAF, Director of Procurement and Production, announced recently that Stephen Armstrong and Lieutenant John W. Swett were commended for making the outstanding procurement action for the month. The "Buy" award is made monthly to the person or persons responsible for the best procurement action completed in that time.

Headquarters 6th Infantry Division and Fort Ord, California. Army engineers from the 84th Engineer Battalion, recently completed the most unconventional movement of a locomotive in the history of the Southern Pacific Railroad. Atop a borrowed tank retriever (see photograph), the locomotive and tender were moved to the new "Dennis the Menace" playground in Monterey's El Estero Park. Donated by the Railroad to the City, Major General Gilman C. Mudgett's assistance was requested by Monterey city engineer, M. R. Pearce, who added the well-known comment, "Another job well-done, by the United States Army."



Lakehurst Naval Air Station, New Jersey. Construction is under way on a \$15,000,000 facility for testing aircraft carrier plane launching and recovery systems. Expected to take almost two years, the new testing facilities will provide the Navy with needed space now lacking in Philadelphia.

The Army Aviation Center, Fort Rucker, Alabama. Mr. Stanley Hiller, Jr., founder and president of Hiller Helicopters of Palo Alto, California, was guest speaker at the second meeting of the Fort Rucker, Alabama, Section of the American Helicopter Society, at a recent dinner meeting. Mr. Hiller was introduced by Colonel Jules E. Gonseth, and made a most interesting talk to the 200 members of the Society.

Headquarters Air Defense Command, Colorado Springs, Colorado. One of the Air Force's new Texas Towers will help Hollywood cameramen film ocean sequences for the Warner Bros. movie, "Spirit of St. Louis," story of Brigadier General Charles A. Lindbergh. The filming will be shot off Cape Cod on the operations deck of the Georgia Shoal Air Force Station, the first Texas Tower built for the Air Force.

U.S.S. Badoeng Strait (Aircraft Carrier), San Diego, California. A television transmitter was temporarily installed aboard the carrier during her recent two-month tour in the Pacific, and beamed to other ships in her task force. The 200-

watt transmitters of aircraft carriers and ships through the Office of Naval Affairs and Education.

Fort H. wave "g" vide flight-poppers, other sells and being to The "D" was dev World V in an ar Europe. radio sig frequen tional cation. Decca s 1954 by Bendix A Hollywood

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watt transmitter brought recordings of network programs, news and educational films to her sister ships through the courtesy of the Office of Armed Forces Information and Education.

Fort Huachuca, Arizona. A radio-wave "grid" system that can provide a continuous, all-weather flight-position picture for helicopters, other aircraft, sea-going vessels and mobile ground units, is being tested at this installation. The "Decca Navigation System" was developed in England during World War II and is now in use in an area 1,500 miles long across Europe. It uses low-frequency radio signals in contrast to the high-frequency pattern used in conventional cross-country aircraft navigation. American rights to the Decca system were obtained in 1954 by the Pacific Division of Bendix Aviation Corporation, North Hollywood, California.

Military District of Washington, Washington, D. C. A Retired Activities Unit to serve the 1300 retired Army personnel residing in the District, has been established as a branch of the Adjutant General's Section. The Unit is located in Room 1640 at MDW's Gravelly Point, Virginia, Headquarters, and may be called at Liberty 5-6700 extension 78400. A similar unit is located at Fourth Army Headquarters, Ft. Sam Houston, Texas.

United States Naval Academy, Annapolis, Maryland. \$4-million is being requested to acquire land and prepare plans for a much needed airfield for the Academy. Dropped last year during a House-Senate conference, high hopes are being held for an approval this year.

Fort Lee, Virginia (AFPS). Logex '56, a logistical exercise involving more than 5,000 military personnel, will be held this month at Fort Lee. The test will extend supply operations which were carried out in Exercise Sage Brush. Eighth in a series of annual exercises, Logex '56 will emphasize team play by the Army's services, and the co-operation among the Army, Navy and Air Force required to provide

logistical support in a theater of operations. Student officers from the Army technical schools will assume command and staff roles during Logex.

Seymour Johnson Air Force Base, North Carolina. The Tactical Air Command is reactivating this installation as another link in continental air defense. When ready for operations this summer, about 3,000 military and civilian personnel will man the base intended for jet fighter operations. The first unit to be stationed there will be the 83rd Day-Fighter Squadron to be equipped with F-86F Saberjets upon activation.

The Engineer Center and Fort Belvoir, Virginia. Brigadier General David H. Tulley, USA, has been named by Lt. Gen. S. D. Sturgis, Jr., Chief of Engineers, as Commanding General effective 1 May. General Tulley will replace Major General Louis W. Prentiss, who will retire at the end of April after 35 years' service.

Headquarters First Army, Governors Island, New York. National Guardsmen and Army Reserve Personnel numbering near 100,000, are scheduled to participate in field training this summer in the First Army Area. Five 15-day periods have been established between 23 June and 1 September.

Chrysler Announces Billion Dollar Expansion

Chrysler Corporation plans to spend more than one billion dollars in the next five years to expand its plants and is pushing research on gas turbine engines, electronics and nuclear and solar energy "to prepare for the tremendous markets that are going to open up in the years ahead."

This confident investment in the future was announced by L. L. Colbert, president of Chrysler Corporation, in an address before the National Press Club here.

"The way it looks right now, taking into account the probable increase in demand for our products and plans for modernizing our plant and equipment," Colbert declared, "in the next five years we will put over a billion dollars on the

line for capital improvements and expansion. This amount is exclusive of tooling. It includes the cost of land, buildings, machinery and other equipment.

"It may very well be that if the company continues to move in the years ahead as it has in 1955, we will find it necessary to revise our investment plans upward."

The expansion program, he said, will include facilities for making passenger car bodies; construction of new assembly plants and improvement of existing ones; new office buildings for management staffs; expansion and modernization of plants making engines, transmissions and other automotive components; and an enlarged engineering program with new laboratories and testing facilities.

"In addition," he said, "we are expanding our research in the development of the gas turbine and other experimental automotive engines, in the field of nuclear energy, in electronics, as it applies to vehicles, and in the applications of solar energy. This whole forward engineering program means that Chrysler Corporation is planning to stay in the forefront of our fabulously creative, technological civilization."

Much of the machinery in the expansion program will be automatic, Colbert declared, and he said that he believes there are three "tremendous advantages to the economy in the rapid development of automation at the present time."

"Automation is coming along at a time when the total population of this country is increasing much faster than the number of people available for productive work," he said. "It has been estimated, for instance, that in the next ten years the population will increase by 20 per cent and the portion of the population available for work by only six per cent. In this situation, with proportionately fewer hands to do a lot more work, automation is going to be a very timely blessing indeed."

Air bases in French Morocco were built by Army Engineers at impressive speed when it was felt there was a possibility World War III was about to begin.



Book Reviews

by D. D. Corrigan

Universal Knowledge

"ENCYCLOPAEDIA BRITANNICA," 1956 Edition, 24 volumes.

Bells ring, sirens scream, trumpets herald the biggest release in the book world. The new edition of the Encyclopaedia Britannica is now available. Here is the world's largest single source of knowledge, the oldest, most respected, and widest read reference work in the English language. Known as the Cadillac and mink of the book world, Britannica stands at the top of its field.

The question I am most often asked is, "What encyclopaedia do you recommend?" So many requests have come to my desk from readers of ARMED FORCES MANAGEMENT that there will be presented in the next several issues a review of this set.

The basis of any library should be the best possible encyclopaedia. But just exactly what is an encyclopaedia? An encyclopaedia, according to Webster, is "a summary of knowledge, a brand of knowledge, a work in which the various branches or field of learning are treated in separate articles."

The Encyclopaedia Britannica is a valuable and necessary requirement for authoritative facts and knowledge. Many leaders of industry, business, and government feel that buying the Britannica is an expenditure well warranted for use by their personnel in keeping abreast with new developments in every field of information.

For families looking to the future, wishing to review the past, and being aware of the present, a reference work should be in every home. The tremendous editorial accomplishments which preceded this publication makes the 1956 Encyclopaedia Britannica the outstanding reference work.

On the Beam

"FLYING THE OMNIRANGE,"

by Charles A. Zweng and John Dohm. (Pan American Navigation Service and Weems System of Navigation, 153 pages, \$4.00).

A few weeks ago I had a first-hand demonstration of flying the omnirange. This flying experience showed me how the VHF omnidirectional radio range actually works, and led me with great interest to read "Flying the Omnirange," by Charles Zweng and John Dohm.

While this is the third edition of this book, it is for all purposes really a new book. The second edition in 1952 presented information which has changed so radically that a complete revision was necessary.

Written from the pilot's viewpoint, Zweng and Dohm designed their book as a "guide for the thousands of pilots, student-pilots, and aircraft owners" explaining "cross-country flying by VHF omnidirectional radio range—the omnirange as it's commonly known. An incidental purpose is to provide a brief study of distance measuring equipment and the course-line computer."

The last four years has seen the omnirange program develop to the point where installations have been finished, omnirange airways are in operation, distance measuring equipment is now in use, and many new models of omnirange receivers are available.

Complete data is given on the background of the C.A.A.'s air navigation program, a clear picture of how omnirange and VHF actually work, an example of a typical omnirange flight from San Francisco to Burbank, omnirange receivers, distance measuring equipment, and the course-line computer. Study questions and answers, a glossary, and a map of all omnirange airways in the United States help explain the text matter as do the many diagrams and illustrations.

The concluding chapter describes TACAN (tactical air navigation), the system favored by the Air Force and Navy. While many readers will not completely agree with Zweng and Dohm, awareness and information on all phases of air navigation creates understanding and comprehension.

As You Like It

"ISLAND IN THE SUN," by Alec Waugh (Farrar, Straus and Cudahy, 538 pages, \$3.95).

Grainger Morris, a focal character in Alec Waugh's new novel, recalls a lecture he heard at Oxford on the structure of the drama. The words of the lecturer set the tone and pace of "Island in the Sun."

"The end is foreseen in the beginning. When the denouement is reached the audience recognizes that no other climax was possible, that given those characters, in that situation, against that background, the drama could not have worked to any other close. Yet at the same time in the working out of the plot, each new step, each new incident must surprise the audience. The audience must be kept guessing all the time as to what is going to happen next, even though it knows subconsciously how the threads will be unraveled."

"Life is an adventure because every day is different: that is why a good play must be exciting, but never forget that it is one of the functions of the play to show behind that hour by hour, day to day excitingness, the eternal forces that control the wind and tides of human action, working out their own inevitable pattern."

This is exactly the thesis that Mr. Waugh sets out to prove and does prove in a manner both exciting and satisfying to the reader. This reader is kept guessing, yet the action and climax were always inevitable.

The setting is an island in the Caribbean. Against this colorful background of exotic beauty, steamy climate, and native unrest, the white and black characters form a sharp contrast. The catalysis is a news correspondent who ferrets out unknown facts about the island and the islanders, and whose disclosures change the lives of everyone with whom he comes in contact.

This book is being read by many and will continue to be read, because it is a good novel, and a good novel these days is hard to find.

Words, Words, Words

"THE NEW MILITARY AND

ARMED FORCES MANAGEMENT

NAVAL DICTIONARY," edited by Frank Gaynor (Philosophical Library, 295 pages, \$6.00).

"POCKET ENCYCLOPAEDIA OF ATOMIC ENERGY," edited by Frank Gaynor (Philosophical Library, 204 pages, \$7.50).

Frank Gaynor has edited two outstanding reference books. The first one is an up-to-date military and naval dictionary, defining over 7000 terms used in all branches of Armed Forces—Air Force, Army, Navy, Marine Corps, Coast Guard, Civil Defense. Included are charts on organization and functions of departments of Armed Forces. Maps, naval vessel and craft nomenclature, and a comparative outline of ranks and grades in the Armed Forces add to the value of this book.

Technical terms as well as slang expressions used in the field are to be found in this glossary plus the newest data concerning missiles, rockets, electromagnetic systems. This work has a wide coverage, and is complete from "A-1" to "zoom."

The "Pocket Encyclopaedia of Atomic Energy," explains the terms used in the field of Nuclear Physics and Atomic Energy. Individual entries are included indicating: "chemical symbol, group of the periodic table, name of discoverer, date of discovery, atomic number, atomic weight, melting point, specific gravity, stable isotopes, radioisotopes." Every member of the known radioactive families is indicated, along with definitions on subjects such as nuclear fission, tracer technique, and atomic and H-bombs. The two thousand entries, charts, tables, illustrations, biographical descriptions of outstanding physicists and chemists make this a "must" reference book for those interested in atomic energy.

April Flowers, Green Grass, and Spring

"WALT WHITMAN RECONSIDERED," by Richard Chase. (William Sloane, 191 pages, \$3.75).

With the awakening spring often comes a longing to escape from everyday routine and the pressures of making a living by enjoying na-

ture and perhaps reading a little poetry. A good companion piece to "Walt Whitman Reconsidered" is "Leaves of Grass," Whitman's poem which just had the hundredth anniversary of the first edition.

Whitman has been called many names—genius, immortal, immoral, and obscene. Richard Chase examines the poet and his works; this is not the story of Whitman's life. Many of the poems are taken up in detail with an understanding literary criticism.

To reconsider Walt Whitman is to understand his works. This book is a tribute to a great poet.

Recommended Reading

"I AM A MATHEMATICIAN," by Norbert Wiener. (Doubleday, \$5.00).

This brilliant mathematician has just published his autobiography. He is well known in many fields of science, but is best known for his work in "Cybernetics."

"THE REVOLT OF GUNNER ASCH," by Hans Hellmut Kirst. (Little, Brown, \$3.95).

From the other side comes this story by a German about a German soldier, presented with humor and yet resentment.

"THE ATLANTIC BATTLE WON," by Samuel E. Morrison. (Little, Brown, 399 pages, \$6.00).

The tenth volume in the "History of United States, Naval Operation in World War II." This volume tells of the offensive that finally led to the victory over Nazi Germany.

"THE STAFF ROLE IN MANAGEMENT," by Robert C. Sampson. (Harper and Brothers, 226 pages, \$4.00).

A discussion in detail of the staff concept, the problems and pitfalls of staff as applied to management today.

"SUCCESSFUL LEADERSHIP IN BUSINESS," by Charles A. Cerami. (Prentice-Hall, 224 pages, \$4.95).

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Air Force Tests TM-61B Martin Matador

The Martin Company today announced that successful test firings have been made with a new version of the Martin Matador tactical missile, known as the TM-61B.

The new missile is longer, and carries a larger nose section than the present USAF TM-61 Matadors which are the Air Forces' first operational tactical missiles deployed on a ready-alert status in Europe.

Test firings of the TM-61B have been performed at the Air Research and Development Command's Holoman Air Force Base in New Mexico.

For tactical missions, the TM-61B will be given an entirely new airborne guidance system, Martin officials said. The design for the present operational guidance system used for the Matador won for a young Martin electronics engineer, Giles J. Strickroth, 33, the 1955 Lawrence Sperry Award. This award was presented to Mr. Strickroth January 22, at the annual meeting of the Institute of the Aeronautical Sciences in New York City.

Over one-fourth of the people in the U.S. live within range of atomic missiles that could be launched in a sneak attack by

Modern submarines, able to make long voyages while completely submerged, and to launch nuclear missiles in a sneak attack, are among the most sinister weapons of this atomic age.

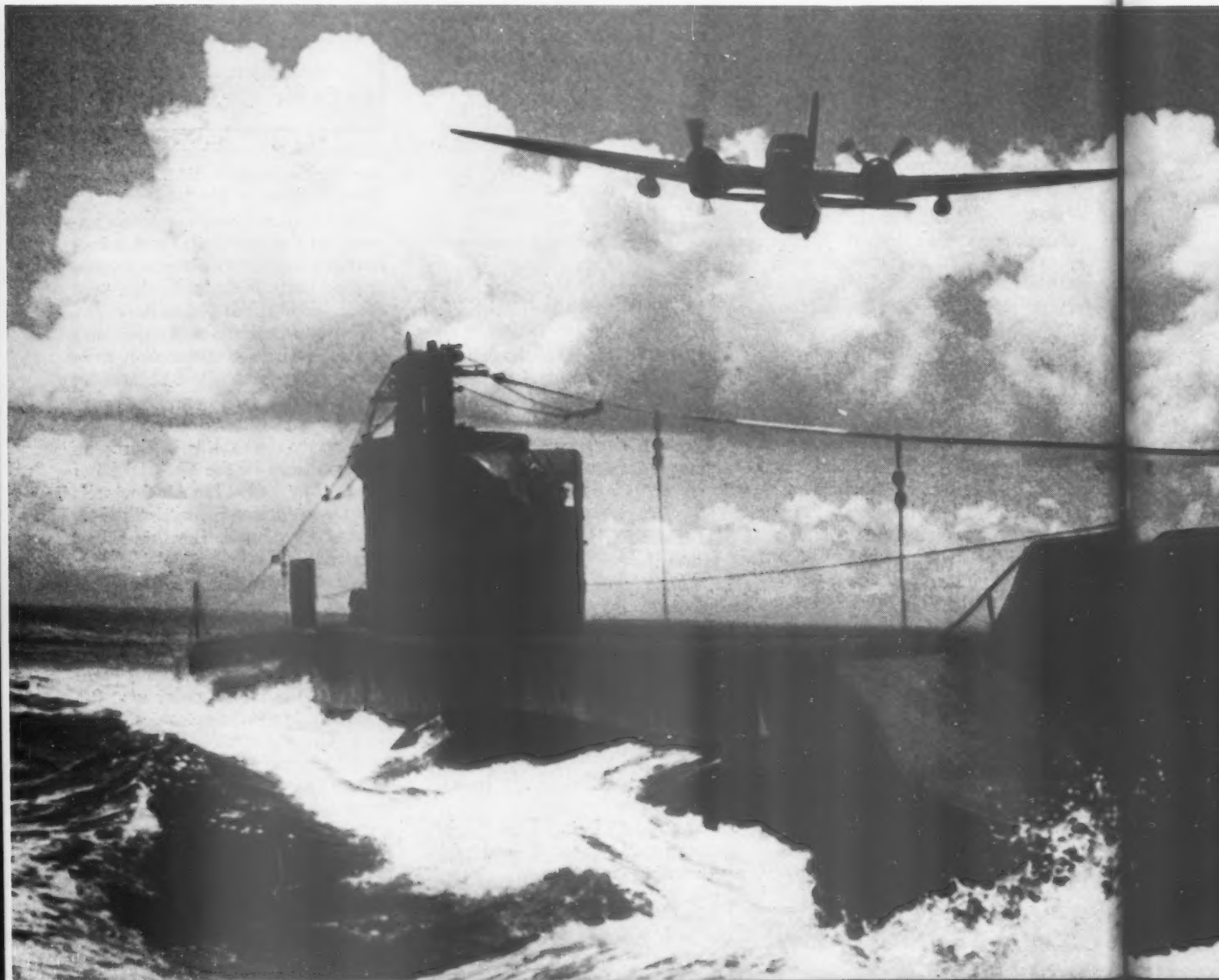
To safeguard our nearly twelve thousand miles of coastline against sub invaders, the U.S. Navy for ten years has patrolled immense areas of the ocean, in fair weather and foul, in Lockheed P2V Neptunes. Special submarine detection gear enables the P2V, despite darkness or fog, to pinpoint even submerged subs. And pro-

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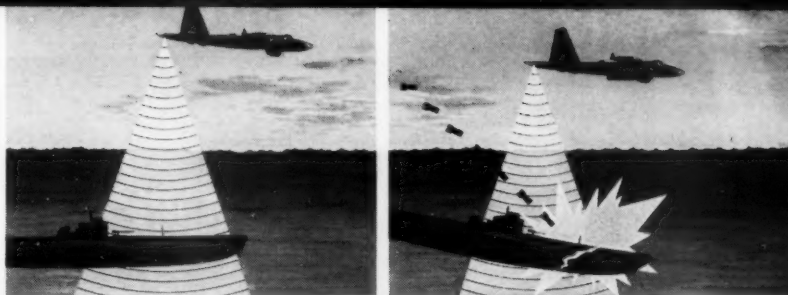
ENEMY SUBS!

A CRUCIAL U.S. DEFENSE PROBLEM

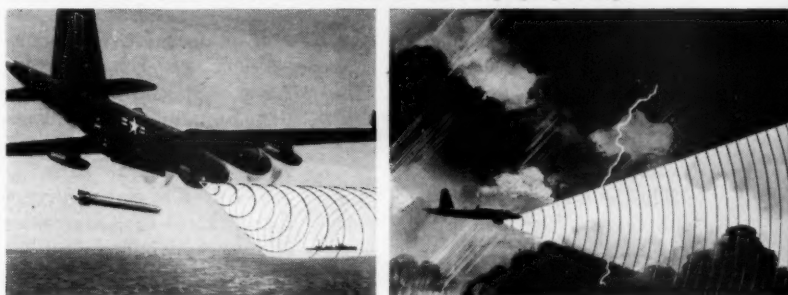
Official R.A.A.F. photo (below) shows war games "attack" on British sub by Royal Australian Air Force Neptune. (P2V's are in military service for the following friendly countries: Australia, Canada, Great Britain, France, Japan and the Netherlands.)



gressive modifications of the P2V have kept it militarily up to date at lowest cost to the Navy. Pound for pound, and dollar for dollar, the P2V *Neptune* is the most formidable patrol aircraft bearing the insignia of the U.S. Navy. Recently the Navy awarded Lockheed its 24th contract for P2V *Neptunes*—a tribute to Lockheed's leadership in weapons system management, the development and application of electronics, and the design and production of long-range patrol aircraft.



These drawings illustrate the multiple-mission capabilities of the P2V *Neptune*: **1** Low-flying P2V's electronic gear spots submerged sub because its presence distorts the earth's magnetic field. **2** Depth-bombing a submerged sub, **3** torpedoeing a surface ship or laying mines to disrupt enemy shipping are jobs the P2V can do equally well. **4** Spotting hurricanes and reporting their velocity and direction are routine but important P2V missions which save human lives and vast sums in property damage.



Lockheed Missile Research Laboratories to Be Built in Stanford's Industrial Park

A series of research laboratories will be constructed by Lockheed's Missile Systems Division on a 22-acre site adjacent to Stanford University, Palo Alto, California. On a nearby site of 275 acres, at Sunnyvale, Lockheed will build extensive new engineering, manufacturing and administration facilities. Lockheed's 3,000 scientists, engineers and technicians now developing guided missiles and unmanned aircraft at Van Nuys will transfer to Palo Alto and Sunnyvale as rapidly as construction permits.

The proximity of both new sites to Stanford will make the university's outstanding academic resources available to Lockheed research teams. And the new laboratory facilities to be built by Lockheed will provide Stanford scientists with technological tools and consulting opportunities hitherto unavailable.

ATTENTION, STUDENTS WHO DESIRE MASTER OF SCIENCE DEGREES: Lockheed's Advanced Study Program helps students achieve MS degrees in Mathematics, Electrical and Mechanical Engineering, Aeronautics and other physical sciences. Write: LOCKHEED MISSILE SYSTEMS DIVISION, Van Nuys, Calif.

(Below: aerial photo of Stanford campus.)



LOOK TO LOCKHEED FOR JET LEADERSHIP, TOO

LOCKHEED

AIRCRAFT CORPORATION

California Division, Burbank, Calif.

Georgia Division, Marietta, Ga.

Missile Systems Division, Van Nuys, Calif.

Lockheed Air Terminal, Burbank, Calif.

Lockheed Aircraft Service, Burbank, Calif.



ARMED FORCES MANAGEMENT ASSOCIATION

NEWS and ACTIVITIES

Baltimore Chapter: Colonel Claude J. Merrill has been elected as Board Chairman of the Baltimore Chapter to fill out the unexpired term of Lt. Col. Robert M. Elrick who has been assigned to the Air Force Academy as a Staff Instructor. Colonel Merrill is Deputy Commander of the Chemical Corps Materiel Command.

The January meeting of the Chapter was on the subject "What Everybody Should Know About the Stock Market" presented by the investment firm of Merrill Lynch, Pierce, Fenner & Beane. The February meeting will consist of a lecture by a Department of Defense representative on the use of digital calculators and other electronic devices.

Headquarters Third Army, Fort McPherson, Georgia—Lt. Col. Gilbert W. Curl, Sr., of Hot Springs, Ark., was presented the Third Army Certificate of Achievement in ceremonies here last week.

The brother of Chester A. Curl of 106 Leach St., Hot Springs, Lt. Col. Curl was awarded the Certificate for "meritorious performance of duty" as Assistant Chief of the Management Division of the Third Army Comptroller Section from August, 1954, until last week.

Col. F. B. Harrison, Deputy Third Army Comptroller, presented

the citation to Lt. Col. Curl, on behalf of Lt. Gen. Thomas F. Hickey, Third Army Commander, who signed the certificate.

It praised Lt. Col. Curl for his services at Headquarters Third Army, "especially his supervision of development and staff coordination of the Comptroller aspects of Third Army operational plans."

The Hot Springs native was further praised for "energetically discharging his duties with enthusiasm, willingness, and efficiency."

Lt. Col. Curl leaves Fort McPherson in early March for a new assignment with the U.S. Military Assistance Advisory Group to Indo-China, with headquarters in Cambodia.

He is married to the former Janet Wright of Louisville, Ky. He and Mrs. Curl have three children: Gilbert W., II, age 12; Walton, 9, and Catherine, 5.

New York Chapter. "Electronics for the Office," was the subject of discussion when Mr. J. W. Haslett was the special guest of the New York chapter of the Armed Forces Management Association. Mr. Haslett, who was one of the organizers of the Systems and Procedures Association, and who is head of the Methods Department, Shell Oil Company, led the discussion at the Wednesday, March 14th, meeting.



LT. COL. GILBERT W. CURL, SR., (c) of Hot Springs, Ark., receives the Third Army Certificate of Achievement from Col. F. B. Harrison, Deputy Third Army Comptroller, as Mrs. Curl looks on. (U.S. Army Photo)

San Francisco Bay Area Chapter No. 10, toured the Ford Motor Company's Milpitas assembly plant on Washington's birthday, 22 February, Bernard Kahn president, reported.

Aberdeen Proving Ground, Md. Concluding their first year of organization, members and guests of the Aberdeen Proving Ground chapter, Armed Forces Management Association, met in the Main Officers' Club at the Proving Ground to hear Maj. Gen. J. H. Hinrichs, deputy chief of the Army Ordnance Corps, and observe the presentation of annual awards and installation of new officers.

Everett C. Schroder, Jr., received the chapter's first annual award for the outstanding professional paper written on management in the armed forces. Mr. Schroder, who is comptroller for The Ordnance Training Command at APG, received the award from Dr. Walter G. Held, outgoing chapter president.

A team award, for outstanding implementation of improved management methods, went to the Management Engineering Division, Administration, Development and Proof Services, of the Proving Ground. Henry E. Dahm, chief of the division, accepted the award from Dr. Held.

Missile Plant Slated For Denver Vicinity

Washington (AFPS)—The Glenn L. Martin Co. of Baltimore has been given approval by the Air Force to build an additional guided missile research and development facility in the vicinity of Denver, Colo.

The Martin company will spend about \$10 million for the plant which is intended to supplement its present operation in Baltimore.

In announcing acceptance of the Martin proposal to build the facility the AF said it will consist generally of a "developmental fabrication plant with added testing facilities remotely located in the Denver area."

About 1,500 to 2,000 personnel will be required at the new center when its facilities begin operating at maximum capacity, the AF said.

UNIFICATION and the Armed Forces Management Association

(An Editorial)

In 1947 when the National Security Act became law the Secretary of Defense stated that "No great economies would flow automatically from this act of unification. Such economies would be achieved only after a substantial period of careful examination and vigorous prosecution of the methods of economy and efficiency."

In the month of April of this year of 1956 achievement of these economies is being accomplished in a new concept of the administration of the records of the National Military Establishment. In suburban St. Louis, Missouri a building containing more square feet of useable space than the Empire State building will be dedicated to the giant housing job of sheltering the service record of American servicemen in every armed service since the year 1912, approximately 30,000,000.

The building is designed with unusual precautions against fire hazards, the amount of wood being held to a minimum. To supplement the humid climate of St. Louis the record area has been provided with exhaust fans to prevent records from becoming brittle and to improve the working conditions for personnel. Another unusual feature of the building lies in its electrical system. To enable a worker to find a record among the voluminous filing cabinets, a master control light box will throw light over the area where the needed cabinet is located.

The Department of Defense Military Personnel Records Center to be housed in this building is administered by The Adjutant General's office of the United States Army.

Personnel and service records of men discharged from the armed services have been housed throughout the country in smaller storehouses and the new center will provide for the first time a unified storage point for all the services.

Only the files of personnel al-

ready separated from the armed forces will be housed in the new center but by no means do they go into "dead storage." Each month there are approximately 180,000 requests for information contained in the National Military Establishment records now stored in the Center.

Veterans, or next of kin, need information for social security claims, hospitalization and military funerals. Spellings and accuracy of inscriptions on overseas tombstones are being meticulously checked due to cost of tombstone. Requests for combat pay for men who died in Korea are filed by their next of kin and records stored at the center serve to adjudicate these claims. Decorations awarded more than a decade ago are still being issued. Maintenance of a serviceman's correct records is estimated to be worth about \$50,000 to the average veteran—that's the amount the average value of a man's service is estimated to be worth in terms of educational, home buying, insurance, hospitalization, and other benefits. But none of these is collectible without such documents as an honorable discharge; and the records center does a landoffice business supplying veterans with replacements of discharges and other lost documents.

With accessibility at such a premium, the new center has been designed to insure the finding of specific records in less than ten minutes. Rows of offices cross the front of the building on each floor. Behind these are set hundreds of five-drawer and higher steel cabinets and shelves. Records of each individual are either jacketed and filed in these cabinets or contained in thousands of feet of microfilmed reproductions of old morning reports and records. The files will be grouped alphabetically and placed in sections adjacent to offices where the personnel assigned to handle each one will work. Determining the outline of these alphabetical sections is no simple matter of



INTRODUCING:

Col. Carolus A. Brown, president and one of the founders of the Central New Jersey Chapter, Armed Forces Management Association, with headquarters at Fort Monmouth, N.J. Col. Brown has enjoyed an active and versatile career with the Army Signal Corps.

Born in Atlanta, Ga., Oct. 24, 1913, he attended Georgia Tech. and the University of Illinois, The Signal School, Command and General Staff School, Army War College, and Command Management School, Fort Belvoir.

He entered the Army as a Reserve officer in 1937 and was commissioned in the Regular Army in 1938. In World War II, he served as Signal officer, 103rd Infantry Division, European Theater. During the post war years, he was Signal Officer, Deputy Signal Officer, and Acting Signal Officer, 7th Army, Germany; Deputy Director, Theater Signal Communications Service, European Theater; Chief, Engineering Control Branch, Research and Development Division, Office of Chief Signal Officer, Washington, and Assistant Chief, Research and Development Division, Office of the Chief Signal Officer.

Col. Brown served as Signal Officer, 40th Infantry Division, and as Chief, Communications Division, Signal Section, 8th Army, in the Korean conflict. On his return to the States he became a student at the Army War College, Assistant Deputy Commander, Signal Corps Engineering Laboratories, and on Sept. 1, 1955, was appointed Director of Evans Signal Laboratory, a component of the Signal Corps Engineering Laboratories.

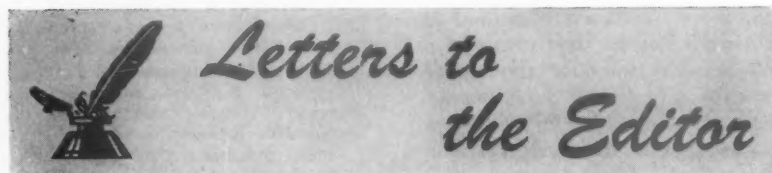
His decorations include the Legion of Merit, Bronze Star and Commendation Ribbon.

A.B.C. Many more names begin with certain letters than others, and the problem is to divide the filing space according to the frequency with which these letters are used. According to a recent study more letters begin with the letter "S" than any other. Close behind are the "B" and "M." Despite the number of Joneses, "J" is far down the list. The letters "Q," "I," "Y," "Z" and "X" have very few adherents.

Centralization, with the various agency records located in one building, together with the improvements in the newly constructed building, will contribute greatly to improvement in the administration of records and services rendered, and will result in substantial savings. In addition to the savings presently effected, the con-

solidation of former armed forces personnel records in one location will permit an interchange of information between services at the operating level. This will tend to continue to improve operational procedures with a resultant improvement in effective personnel utilization.

In this connection the Armed Forces Management Association is widely used as a vehicle contributing to harmony within the National Military Establishment. During its working committee sessions there is an enthusiastic interchange on managing and engineering techniques attained and improved by each individual agency. This tends to advance understanding and conformity between agencies of the military establishment.



3063 Ordway St., N.W.
Washington 8, D.C.

Dear Mr. Southworth:

I am inclosing my check for \$3.50 to cover one year's subscription to *Armed Forces Management*, beginning with the January, 1956 issue.

Congratulations on giving this vital material on Atorgenics recognition in your publication.

I would not consider my library on advanced management techniques to be complete without a full set of these articles by Col. Kuhre.

He is so far ahead of the run-of-mine Army thinking in these channels that it is pathetic!

And since Army is presumed (by many at least) to lead industry's thinking on organizational problems there is quite a bit of room for improvement there, too.

Thank you for giving my order your attention.

Sincerely yours,
Lawrence W. Conant.

Editor's Note: Again this month, we have received many letters in reference to the series on Atorgenics by Colonel Leland B. Kuhre,

and while it is impossible to print them all, we should like to acknowledge each and thank you for writing. The following is typical of the many received and we are interested with Colonel Kuhre in your response to the subject.

Fort Leavenworth, Kansas
14 February 1956

Dear Editor:

I certainly enjoyed the feature "What Management Means to Me" by Claude E. Davis, explaining mutual funds. It gave me much "food for thought" and I know it did the same to many of your readers. Until your publication of this feature, I was one of those individuals who was interested, and still befuddled by mutual funds. Thank you again—

Sincerely,
Major J. Thompson

Fort Dix, N.J., one of the largest Army installations in the United States, encompasses 32,635 acres in Southern Jersey, with 8,700,000 square feet of buildings.

Dear Major Thompson:

Thank you for your letter and we are pleased that you found this feature informative.

Naval Supply Depot
Seattle, Washington
27 February 1956

Gentlemen:

It will be appreciated if you are able to furnish the address where the following publication is available: **QUANTITATIVE MANPOWER ANALYSIS**

by
Cyrus A. Martin

W. B. Kimball, Jr.,
Procurement Division Supervisor

Dear Mr. Kimball:

Thank you for your letter of 27 February, and you may obtain a copy of Quantitative Manpower Analysis, from the Frederick Research Corporation, 4630 Montgomery Avenue, Bethesda 14, Maryland.

Tubeless Truck Tires Standard for GMC

Tubeless truck tires, the most important truck tire development since pneumatic tires replaced hard rubber treads 40 years ago, are becoming standard equipment on all 1956 GMC "Blue Chip" trucks.

GMC is making the changeover because it is convinced the simplicity, safety, durability and dependability of tubeless tires will benefit the trucking industry immeasurably.

All of these factors will mean greater profits to truckers through bigger payloads, less "downtime," safer repairs, fewer emergency road "fixes," reduced maintenance costs, less damage claims, and smaller parts inventories.

Performance reports on tubeless truck tires support these conclusions.

In a three-month comparison of 1,740 tubed and 3,674 tubeless tires, a large truck company reported the tubed tires had 368 punctures against 51 in the tubeless tires. Tubed tires caused 111 road delays, tubeless tires only 10.

Besides cutting "downtime" through fewer flats and road delays, the tubeless tires also were more durable. On drive wheels, tubeless tires ran 10,000 miles farther than tubed tires before requiring retreads.

ARMED FORCES MANAGEMENT

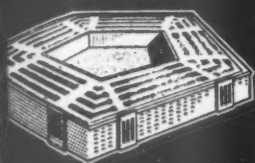


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Washington Management

Department of the Navy. Rear Admiral James H. Thach, Jr., has been designated as the new Commander Military Sea Transportation Service, relieving Vice Admiral Francis C. Denebrink who has served as COMSTS since December 1952. Admiral Thach will be advanced to the three-star rank of Vice Admiral upon reporting this month as COMSTS.

Department of the Army. A recent announcement revealed that an estimated savings of more than \$19,000,000 will result from suggestions made by Army military and civilian personnel during Calendar year 1955. A total of 66,468 recommendations were received from military and civilian personnel, who received a total of \$362,955 for their ideas. This represents an increase of more than 7,000 suggestions received during 1955 than for the previous year, with a corresponding increase in estimated savings of more than \$4,000,000.

Department of the Air Force. Tactical Air Command's 309th Troop Carrier Group, the first unit of the Air Force to be equipped with the new Fairchild C-123 fixed wing assault transport, will leave the United States for Europe this spring. It is intended that the 309th will become a part of the 322nd Air Division and take its place in the support structure of USAFE. The C-123 can carry up to sixty combat troops or a 16,000 pound load, and will materially increase the combat effectiveness of the NATO forces.

Department of Defense. Uniform policies to govern military services in transportation of personnel via commercial air carriers were placed in effect on 1 March. Spelled out in defense instructions 4500.24, 4500.25 and 4510.2, each

service must submit its individual rules and instructions implementing the new policies within 45 days. Covering such subjects as maximum loads, the use of pressurized equipment when available and schedules, reliability, accommodations and standards of service, they are intended to increase efficiency in movements.

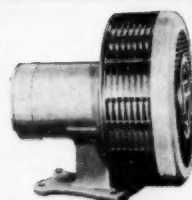
Department of the Army. Major General Robert G. Gard, Deputy Commanding General of Third Army, has been assigned to Headquarters, United States Army Forces, Far East Japan. He will report to his new assignment in May.

Department of the Navy. A research program to determine the possibility of using totally deaf persons to work where jet engines develop more noise than can be endured, is in progress at the Naval Air Station at Pensacola, Florida. While this represents only a portion of the problem of jet engine noise, it may be similar to the World War II studies of using color blinded individuals to "see-through" camouflage.

Department of the Army. Use of division designations to identify certain Army training centers will be discontinued to provide one which will more clearly indicate the center's basic mission of training. Affected by this action are the training centers now designated as the 69th Infantry Division (Training), at Fort Dix, the 101st Airborne Division (Training), at Fort Jackson; the 5th Armored Division (Training), at Camp Chaffee, and the 6th Armored Division (Training), at Fort Leonard Wood. The 69th, the 5th and 6th will be in-

Simple LOGISTICS

Those who use sirens on military vehicles know how important it is to have an adequate warning signal, many have learned the hard way. Merely putting in a request for a "siren" does not assure procurement of an efficient signal. Too often loose specifications will procure useless or inefficient materiel.



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activated and the present locations designated as: The United States Army Training Center, Infantry, Fort Dix; The United States Army Training Center, Field Artillery, Camp Chaffee, and the United States Army Training Center, Engineers, Fort Leonard Wood.

Department of the Air Force. Assignments in Air Force Weather Service are available to AFROTC graduates in certain categories and active duty company grade officers who meet prerequisites, to fill present shortages. A one-year training course offered at 11 civilian universities over the country should soon alleviate the shortage.

Department of Defense. The reserve machine tool and facilities policy has recently been clarified by the Defense Department and the Office of Defense Mobilization. Directives implementing the change are being issued.

Department of the Army. A tactical exercise under Arctic conditions was conducted by Army airborne units in Exercise ARCTIC NIGHT during March, 1956, at Thule, Greenland.

A battalion combat team from the Army's 82nd Airborne Division was airlifted to Greenland from Fort Bragg, North Carolina, to participate in the exercise, designed to provide training in extreme cold weather and ice cap operations.

Maneuver Director for the exercise was Lieutenant General Glenn Barcus, Commander-in-Chief of the United States Northeast Air Command. The Tactical Air Command, U. S. Air Force, conducted airlift and aerial resupply operations for the maneuver.

Department of the Navy. The Navy has announced plans to build its first atomic powered submarine equipped to fire guided missiles.

Construction will begin on the sub (SSGN), which is part of the fiscal '56 shipbuilding program, later this year at the Mare Island, Calif., Naval Shipyard.

According to original specifications, it was planned that the sub would fire missiles, but it was to be powered conventionally.

At the same time, it was announced that two other conven-

tional submarines—the Grayback and Growler—will be modified to fire the Regulus, the Navy's surface-to-surface guided missile.

Both are now under construction, the Grayback at Mare Island and the Growler at the Portsmouth, N. H., Naval Shipyard.

The Navy now has two guided missile subs in the fleet—the Tunny and Barbero.

Navy Secretary Charles S. Thomas said the design changes are being made "to take full advantage of new technological developments."

He stated that the changes "will greatly enhance the combat capabilities of the three submarines and will result in a significant increase in the Navy's striking power."

Department of the Army. The morale within the Army Antiaircraft Command has taken a swing upward with the authority granted to lease 750 family housing units near its NIKE guided missile batteries. Leases are being negotiated in the New York, Boston, Washington, Baltimore, Philadelphia, Chicago, Detroit, Los Angeles and San Francisco areas. In addition, some \$8,000,000 has been approved for construction of family-type units.

Department of the Navy. "Records Disposal Month," the first in a series of campaigns to be conducted during 1956 by Navy Department organizations aimed at improving paperwork, reducing its burden and lessening overhead costs, came to a close on the last day of March. Too early to tabulate results, the Secretary of the Navy's program is being evaluated by the other services.

Department of the Air Force. Two F-84F Thunderstreaks dashed across the U.S. recently at an average speed of 670 miles an hour—18 mph faster than the recorded speed record for jet fighter-bombers in transcontinental flight.

The flight began at Norton AFB, Calif., and ended three hours and 34 minutes later at Langley AFB, Va. It was made without refueling, one of the few times such a flight has been made in jet fighter-bombers.

The two planes were piloted by Lt. Col. Robert R. Scott and 1st Lt. Richard Hill III of the Tactical Air Command's 405th Wing at Langley.

The official speed record for a jet fighter-bomber is held by Col. Scott, who streaked across the U.S. at a speed of 652 mph in an F-84F on March 9, 1955.

National Aeronautic Association officials timed that flight at three hours, 44 minutes and 53 seconds.

The Air Force described the latest high-speed coast-to-coast jaunt as a "maximum-range, cruise-control training mission," and said it was made possible by favorable winds.

Department of the Navy. Navy patrol vessels soon will be named in honor of cities in the U. S. with a population between 2,500 and 10,000.

Previously known only by hull numbers, 141 submarine chasers, escorts and rescue escorts will be given the new names. Of the patrol vessels to be named, 32 are in commission and the rest in the inactive fleet.

The change, scheduled for Feb. 15, is in keeping with the Navy's policy of giving names to vessels in place of numbers, whenever possible.

Department of the Army. General Anthony C. McAuliffe, USA, Commander-in-Chief, U. S. Army Europe, has applied for retirement and will leave the service at the end of next month. His successor at USAREUR has not as yet been named.

Department of the Army. The Army now has a hand-held television camera and back-carried transmitter which a soldier-scout can use to send battle pictures to his command post, the Department of the Army has announced.

The unique equipment has been nicknamed the "creepy-peepy" by some soldiers.

Developed by the Army Signal Corps Engineering Laboratories at Fort Monmouth, New Jersey, the camera weighs only eight pounds. The transmitter, or sending station, complete with built-in power supply, scales 47 pounds. An image

equal to or better than commercial quality can be transmitted.

Department of the Air Force. The Air Force has lifted the grounding order on B-52 jet bombers. Some B-52s have already been cleared to fly, and the remainder will be released as soon as correc-

tive action can be completed, it was announced here.

The grounding was ordered after a recent accident in which a B-52 was destroyed.

The Air Force said it had identified the specific cause of the accident and was correcting the problem.



SERVICE SCHOOLS

National Guard Bureau, Washington, D.C. Four school courses are announced as open to Guardsmen. The Army War College Course; The Regular Course, Command and General Staff College; Special Weapons and Guided Missile Orientation Course (applications accepted for courses starting after 30 June 1956); Armored Communication Supervision Course (Enlisted).

Command Management School, Fort Belvoir, Virginia. Class 14 graduated recently with three major generals and three brigadier generals included in the roster. Since its beginning in the Fall of 1954 the Command Management School has graduated approximately 700 post commanders, staff officers, and key civilians. Graduates include members of the Army, Navy, Air Force, Marines and Coast Guard. Experts in the field of management, both military and civilian, appear as guest speakers and assist the school in bringing to its students the latest techniques in management.

Southern Methodist University, AFROTC, Dallas, Texas. A formal Parade and Review commemorating Veteran's Day was held in conjunction with commissioning ceremonies for eight (8) graduating seniors recently at SMU. Reviewing officer was Major General William B. Ruggles, and the event was attended by many other high ranking military leaders in the area.

Naval Air Station, Olathe, Kansas. The Jet Transitional Training Unit

has established a "Flying School" for ship's captains and carrier division chiefs of staff. The one week's jet indoctrination course provides a "check-out" for the Navy's senior aviators, and instruction in operational capabilities and limitations.

United States Air Force Academy, Denver, Colorado. Approximately 5,500 young men have been nominated for admittance to the second class of the Academy which begins in July. The applicants will compete for 300 vacancies. Last year, when both incoming and outgoing members of Congress were permitted to submit nominations, there were approximately 6300 applicants.

Ordnance Management Engineering Training Program, Rock Island Arsenal, Illinois. The thousandth diploma issued to a graduate of the Top Management Seminar, was presented recently to Colonel Bernard Luczak, Chief of the Integrated Range Mission, White Sands Proving Ground. Dr. L. W. Wallace, course director (November 1954 issue ARMED FORCES MANAGEMENT) and Colonel A. R. Cyr, Commanding Officer, Rock Island Arsenal, made the presentation. The five thousandth diploma awarded to a graduate of the school was made at the same ceremony to Mr. Benjamin L. Ridall from Springfield Armory, Springfield, Massachusetts.

Armed Forces Institute of Pathology, Washington, D. C. Doctors from all over the United States have been invited to attend the

AFIP postgraduate course on diseases of the heart to be held in Washington, D. C., from May 14 to 17. The four day course will be open to a total of 425 civilian and Armed Forces physicians, and is designed to familiarize the clinician as well as the pathologist with the problems of heart disease and to acquaint him with the recent advances made in this field.

Aberdeen Proving Ground, Maryland. Members of the staff and faculty of The Ordnance School presently enrolled in a Work Simplification Course, heard Mr. Leon Burnham, Comptroller's Office, Department of the Army, speak on this subject. Mr. Burnham, who is Work Simplification and Management Improvement Coordinator for the Department of the Army, is often called, "The Father of Work Simplification."

Naval Post Graduate School, Monterey, California. A 20-week general line course for women officers has been established at the Navy's Post Graduate School in Monterey, Calif.

The course will be open to women officers who have completed between five and seven years' service. Classes will convene annually in January, June and September.

The school has a 10-month course for male officers. Its purpose is to increase the professional knowledge of line officers to meet the added responsibilities of higher rank.

The Navy said there will be no need to file requests for the course since eligible officers will be ordered to the school "as practicable."

White Sands Proving Ground, New Mexico. A three-day Management Appreciation Course was held last month under the auspices of the Ordnance Management Engineering Training Program. Coordinated at WSPG by the Training Branch, the purpose was to acquaint top management with the background of OMET, management training at the installation and its application.

School of Aviation Medicine,



CONFERENCE LEADERS at the U. S. Army Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Va., discuss methods of instructing others on effective techniques for conducting conferences. Shown are, left to right: H. B. Bennett, Stephen W. Gibson, Sidney Himmelstein, Ruby Stewart, Assistant Training Officer of the Engineer Center; George F. Hall, Norman G. Hansen and Gunga L. Dean. Conference leadership courses are offered to project engineers at ERDL in an effort to cut down on the amount of time required for conferences there.

Randolph Air Force Base, Texas. Sixteen flight nurses were recently graduated at Gunter Air Force Base, bringing to a total 3162 diploma-winners from this organization. The School of Aviation Medicine, which produces flight nurses for both the Air Force and the Navy, has a branch at Gunter which was opened in 1950 to relieve the congestion at Randolph after the outbreak of war in Korea.

United States Merchant Marine Academy, Kings Point, New York. Recent legislation making the Academy a permanent Federal Academy has been approved by the Senate Interstate and Foreign Commerce Committee. The Committee also recommended that the Government continue its financial aid to state maritime academies in Maine, Massachusetts, California, and New York.

Army Signal School, Fort Monmouth, New Jersey. Three signal officers' basic course sections, located in three different classrooms, were instructed at the same time by one instructor recently through the medium of a portable television camera weighing only five pounds. The purpose of the test was to prove closed circuit television's value in widening the teaching scope of expert instructors to a number of classrooms simultaneously. Editor's note—We wonder if perhaps this could be the

answer to teacher shortages in the public school systems.

Reese Air Force Base, Texas. Major Tobias Schindler, commander of the 3500th Pilot Training Squadron, announced recently the graduation of 71 Pilots from Reese. Thirty-five of these were graduates of Class 56-H, and all now proudly wear the wings of the Air Force pilot. Dr. Stensland, head of the adult education department of Texas Tech, was the graduation speaker.

Army Aviation Center, Fort Rucker, Alabama. For the first time in history the United States Army is now using a mechanical device for testing prospective students of the Army Cargo Helicopter Pilots Course. The psychomotor is being tested to supplement, if experiments are successful, the written and oral tests now given helicopter pilot students prior to beginning their training. The experiments are being closely followed by the Air Force.

AFROTC Detachment No. 595, North Carolina State College of A&E, Raleigh, North Carolina. Brigadier General J. C. Crosthwaite, USAF, Deputy Commander of the U.S. Air Force ROTC, was a recent visitor to the campus, and was guest speaker at the Arnold Air Society. Prior to the address, the entire Air Force ROTC Wing,

composed of approximately one thousand cadets, staged a full dress parade and review in the General's honor.

Marine Corps Schools, Quantico, Virginia. The Marine Corps recently gained 316 new Second Lieutenants in graduation ceremonies at Quantico. In addition, 197 additional graduates of the 2d Basic Course, received first station orders.

Florida Firms Lay Plans for Nuclear Power Plant

A major atomic power plant project is being undertaken jointly by Florida's three largest electric utility companies, which are laying plans for "the design, construction and operation of a large-scale nuclear power plant," according to a joint announcement made in Florida.

The three companies, Florida Power & Light Company of Miami; Tampa Electric Company of Tampa, and Florida Power Corporation of St. Petersburg, have entered into an agreement with Allis-Chalmers Manufacturing Company and The Babcock & Wilcox Company, looking to a target date of 1962-63 for the construction and operation of a "major power plant using atomic energy for fuel, to be located at an appropriate site within suitable transmission distance of all three Florida Companies," it was revealed.

W. J. Clapp, president of Florida Power Corporation at St. Petersburg, cited the high cost of fuel oil, which must be imported into Florida from Gulf and Caribbean ports. "We feel that now is the time to make a thorough study of the possibility of using atomic energy. We are eager to find the best answers because we realize our responsibility to our customers to utilize the lowest cost fuel available."

● Number of aircraft firms working on military applications of atomic energy now stands at 10, with some holding contracts from both the Navy and USAF. AF atomic airframe contractors are Convair, Boeing and Lockheed; engine companies are Curtiss-Wright, General Electric and Pratt & Whitney.



By William H. Harrison,
president

The Administration of International Telephone and Telegraph Corporation

THE ADMINISTRATION of International Telephone and Telegraph Corporation has much in common with that of all large organizations, as well as certain peculiarities arising from its complex operations and their international extent.

IT&T is the largest American-owned international enterprise engaged in the development, manufacture, sale, and installation of electronic and telecommunication systems and equipment, the operation of telecommunication services, and the granting of patent licenses and technical aid in those fields.

The IT&T System includes 34 manufacturing and laboratory companies in 19 countries with 65 principal plant locations and nearly 14,000,000 square feet of floor space, a sales organization with hundreds of outlets around the world, and 12 telephone, radiotelephone, or radiotelegraph companies overseas, in addition to the largest U.S. international telegraph network and two marine radio companies giving worldwide service. It employs approximately 108,500 persons altogether, and is active, in one way or another, in practically every part of the Free World.

Management of this extensive enterprise is vested in a headquarters staff of some 250 persons located in New York City and organized along functional lines.

Over 90% of the income of the IT&T System comes from manufacturing and allied activities, the rest being accounted for mainly by telephone, radiotelephone, and radiotelegraph services. Overseas

companies in these fields are administered by the telephone operating department of IT&T Headquarters. International telegraph services from the United States are operated by subsidiaries of American Cable & Radio Corporation, in which IT&T has a controlling interest. Manufacturing and research operations overseas are administered by International Standard Electric Corporation, a wholly-owned subsidiary of IT&T, with headquarters in New York City. Domestic manufacturing operations are carried on by divisions of the parent company.

There are several reasons for this dual system of managing IT&T factories and laboratories. Historically, large-scale research and manufacturing by IT&T was begun abroad nearly 20 years before it was undertaken in the United States, and there are special considerations involved in overseas operations that are not encountered at home.

Decentralization, which seems to be a recent discovery of many American corporations, evolved early in the IT&T System. Considerations of national pride and the great importance attached by every government to telecommunications and their sources of supply, made it advisable to staff our overseas subsidiaries with local citizens wherever possible. Where a high degree of technical competence existed, this could readily be done. But where the requisite skills were not available at all or in sufficient quantity, it was necessary to train the men and women needed.

Today, with very few exceptions,

IT&T maintains no American personnel in any of its factories abroad. In some parts of Latin America, where technical skills are still hard to come by locally, and training programs have not yet caught up with demand, our manufacturing and communication units employ a few executives and technicians who are not nationals of the countries concerned.

To sum up this aspect of IT&T management, it can be simply stated that our policy is ultimately to man our overseas subsidiaries entirely with nationals. We are proud to have pioneered in this field and are happy with the results obtained.

It is an encouraging example in practical internationalism to observe how this heterogeneous IT&T team pulls together and develops an *esprit de corps* under the direction of Headquarters, whose officers are U.S. citizens.

IT&T Headquarters consists of the usual departments—secretary's, treasurer's, comptroller's, legal, patent, patent-licensing, research and development, industrial relations, and information, each with the usual functions—in addition to the telephone operating department already mentioned.

The degree of control exercised over the IT&T System as a whole by these departments of Headquarters varies widely. The closest supervision is maintained by the comptroller's department, which requires uniform reporting by all subsidiaries, no matter where located. Statistical information and, in the

case of subsidiaries overseas, observations on the general economic situation, are submitted monthly by each factory, laboratory, and operating company. Detailed accounting reports are made quarterly for purposes of the IT&T Quarterly Statements. Each company submits its budget for a given year on November 1 of the year preceding. This is regularly reviewed and is subject to change at any time until submission of the next year's budget. Such budgetary flexibility is especially desirable when carrying on business in foreign countries where changing regulations frequently make immediate action necessary.

Next to the comptroller's department, the closest supervision within IT&T is that exercised by the gen-

North American Van Announces New Steel Tote Box Service

Furniture and household goods can now be moved overseas without leaving its own private and sealed "van," as a result of new steel tote box service announced by North American Van Lines, Inc.

A family moving overseas can be assured that its household goods will not be touched from the time it is packed in big steel tote vans until it is unpacked in their new home, according to Stanley P. Troxel, the company's operations manager.

Furniture is picked up by a regular moving van and taken to a warehouse in New York, Norfolk, Seattle, Long Beach, Mobile, or New Orleans depending on destination. There, the furniture and goods, protected by specially designed pads and covers, are transferred to the tote vans. These steel boxes are 8 feet in length and width and 12 feet long, big enough to accommodate any piece of furniture. The weather-proof and damage-proof boxes are then sealed.

They are swung aboard ship and into the hold, Troxel explained. At the port of destination, they are loaded on flat bed trucks by North American overseas agents and taken directly to the new residence, or to warehouse storage, if the family has not yet arrived. Unpacking is done in the home by trained movers.

eral technical department, which supervises System-sponsored research and development as distinguished from projects sponsored and paid for by our own or other governments. However, because the government agencies that operate most telecommunication services abroad frequently engineer much of the equipment they use, it is not possible to insist on as great a degree of uniformity in this area as might otherwise be expected.

It may be of interest to note that research and development sponsored by the IT&T System is divided between central laboratories in the United States, England, France, and Germany, and the laboratory divisions maintained by all of our more important factories, with the division of labor between the two falling roughly along the line that separates basic research from product engineering. All IT&T factories contribute a percentage of their sales for use in research and development. The general technical department has the problem of determining what projects these funds shall be allocated to, and in what proportion and to which central laboratory or factory laboratory division.

The chief problem of System-sponsored research and development is one of coordination, as always. IT&T tries to solve it by a system of technical committees covering all major fields of endeavor. We tried for a while to maintain U.S. and European sections of each committee; but experience proved that the delays and misunderstandings resulting from this device were more expensive than the travel necessary to effect joint meetings, and so the two sections have in almost every case been merged into one.

The committees ordinarily meet three times a year, with as many interim meetings by "task forces" as the occasion may require. Their proceedings, as well as the technical product reports of the general technical department, are made available throughout the System, to keep all units abreast of progress made.

Closely allied with the activities of the general technical department are those of the patent and patent-

licensing departments. With so much activity in research and development going on throughout the System, it becomes necessary to determine what inventions shall be patented and in which countries. This is a problem reviewed by a patent committee at Headquarters, which meets under the chairmanship of the patent department but also includes representatives from International Standard Electric Corporation, the U.S. manufacturing divisions, the general technical department, and the legal department.

The committee meets once a month, or oftener if occasion demands. Its function is to make recommendations regarding the filing of patent applications rather than to issue directives. Any central laboratory or factory that has cause to question a recommendation of Headquarters in this respect is free to do so, for the aim is to reach an agreed solution that will have the enthusiastic support of all. In order to maintain unity of outlook between the patent department of Headquarters and those maintained by the principal subsidiaries, the IT&T patent attorney usually makes a swing around the circuit once a year and, of course, is always available for consultation. If a subsidiary finds one of its patents being infringed, or is confronted by a competitor's patent claim of dubious merit, Headquarters gives patent legal aid as requested.

The patent-licensing department exists to negotiate the use of our patents by others and of theirs by us, within the general policy limits set forth by a patent policy committee, which formulates and reviews from time to time the policies of IT&T and its subsidiaries with respect to the licensing of patent rights. Technical advice on manufacturing and engineering, whether to an IT&T or independent company, is usually given through the manufacturing and engineering department of International Standard Electric Corporation.

IT&T's relations with its telephone, radiotelephone, and radiotelegraph subsidiaries abroad are not unlike its relations with its manufacturing and laboratory subsidiaries there. Each operating company is to a high degree auton-

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mous; but each has a general advisory agreement with IT&T which assures to it general technical advice, in addition to specialized advice as required in operations—plant, traffic, commercial, and accounting.

Because of the very considerable autonomy enjoyed by all IT&T subsidiaries, the Headquarters department of industrial relations is essentially a staff operation concerned with broad policy and lending on-the-spot aid only as required. The personnel and labor relations policies and practices of all subsidiaries are reviewed and suggestions made whenever need is indicated. The department is particularly concerned with the training and transfer of personnel within the System, seeking to avert either scarcity or oversupply at any point. It also encourages each subsidiary to develop its own replacements for key executives, and counsels them regarding suitable technical and business courses in leading universities. Training and experience is also provided through rotation of personnel within System laboratories, factories, and operating companies.

In dealing with public relations for the System, the information department has both staff and line functions. It works closely with the sales and public relations departments of the domestic manufacturing divisions, and with the staffs of International Standard Electric Corporation and American Cable & Radio Corporation as well as of the other IT&T Headquarters departments, in public relations matters having to do with the System as a whole. It is also available to help with specific problems as they arise. In addition, it is directly responsible for all IT&T advertising and press relations, and for the preparation of the IT&T Annual Report and other System publications, both general and technical.

The secretary's department performs all customary duties in connection with corporate meetings of the parent company and certain of its domestic subsidiaries, and is also charged with various administrative tasks having to do with employee pensions and benefits, and the Headquarters building and services.

IT&T's treasurer has the considerable task of keeping track of

over 7,000,000 shares of stock and nearly 60,000 stockholders, and of seeing that the records are kept up to date, that dividends, proxy material, and annual reports are distributed on time, and that corporate funds are invested, transferred, or paid out as directed. He further has custody of the securities of all subsidiary and affiliated companies, and handles all foreign exchange transactions.

General stockholders relations, however, are personally supervised by the president of the corporation with the assistance of the secretary and vice president in charge of the information department.

In handling day-to-day problems in this or any other administrative field, I prefer to meet as often as necessary with the department heads directly concerned, rather than periodically with the staff as a whole. However, I believe it is important to hold occasional meetings of the entire management staff for the purpose of reviewing current conditions, policies, and developments throughout the System as a whole.

In dealing with our manufacturing operations overseas, I have the president of International Standard Electric Corporation to rely on. In dealing with our domestic divisions in that field, I have a vice presidential assistant whose responsibility they are. Similarly, I can rely on the vice president in charge of the telephone operating department

in dealing with our telecommunication subsidiaries overseas, and the president of American Cable & Radio Corporation for that subsidiary in the United States and its operations abroad. Nevertheless, I make it a point to attend all management conferences if possible, in addition to making periodic trips to our field operations. As a result, I spend about a quarter of my time in the field. Reports are no substitute for first-hand knowledge of local conditions at Headquarters; and directives are no replacement for first-hand knowledge of Headquarters in the field.

General Peckham Honored

On Feb. 9 at a luncheon in New York, the Textile Square Club and some 200 executives of the textile and allied industries tendered an industry salute to Major General H. L. Peckham, Chief, Army and Air Force Exchange Service.

In his address, the Exchange Service Chief emphasized the morale importance of exchanges to uniformed personnel in this country and at overseas outposts. He noted that enlisted men in a recent impartial survey had voted the exchange privilege as the number one factor in their consideration of reenlistment. He also mentioned the recent Defense Department statement which paid tribute to the morale value of exchanges.

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A Navy-University Plan of Management Development

by Waino W. Suojanen

Assistant Professor of Accounting,
University of California

SINCE 1951, the School of Business Administration and the Extension Division of the University of California, Berkeley, together with the Bureau of Supplies and Accounts, the Bureau of Aeronautics, and the Bureau of Ships of the Department of the Navy have cooperated in planning and conducting a series of civilian executive development training programs. Sessions are held during the summer months when living accommodations are available on the campus and when University personnel are available for short-term teaching assignments. Each program is of six weeks duration; classes meet six hours a day, five days a week for a total of one hundred and eighty class hours.

The curriculum for each program is developed by a committee drawn from a local Navy installation along with representatives from University Extension and the School of Business Administration. Personnel from the Industrial Relations Department of the local Navy installation provide liaison during the planning stage as well as during the operational phase after Bureau and Department of the Navy approval of the program. Administrative coordination is provided by a subject area specialist of University Extension during both phases of the program. Every attempt is made to provide a curriculum geared to the needs of the Bureau sponsoring the course and each subject is fitted into this overall pattern.

Participants are career civil serv-

ice employees of the Department of the Navy. The sponsoring Navy Bureau allocates the thirty spaces in each class to its shore installations west of the Mississippi. The management of the activity in turn selects the employees who will attend. Nomination to attend is an honor as well as a responsibility—it indicates that the trainee has advancement potential as well as that when he returns he will be closely observed and will, as a consequence, have to show better performance.

Program philosophy

Students in these joint Navy-University training programs are required to spend the period Monday through Friday of each week at a fraternity house rented for that purpose. Female trainees are separately billeted but eat their meals with the rest of the group. There are no exceptions to the "living together" requirement. This includes not only the trainees from distant installations, but it also includes participants who live in the San Francisco Bay area.

The fact that student participants are required to live together has a number of important advantages. Within a very few days after the beginning of the session, the thirty individuals become a cohesive group. Because students from different Navy installations are billeted together, a cross fertilization of ideas and thinking is fostered. By the end of the six week program,

the students have developed group identities and values rather than just thinking of themselves as employees of a particular activity.

Faculty members are selected on the basis of practical experience and leadership ability as much as on their academic qualifications. If they are not familiar with Navy operations, University Extension assigns and pays them for on-the-spot study and observation until they have become generally familiar with Navy parlance and organization. They talk with management personnel and "get the feel" of Navy surroundings. This makes for more realistic course content and improves rapport with the trainee group.

No one method of instruction is used exclusively. The lecture method is combined as much as possible with the discussion approach. In addition, question-and-answer periods provide opportunity for student reaction and aid in clearing up points that present difficulty.

The case method is used as a focus for much of the classroom work. Cases are not, however, used exclusively but are supplemented by both text and reference material. In this way, during the six-week period, the student acquires some acquaintance with the bibliography in each course area.

In the opinion of the writer, the combined case and text method is preferable to an approach that utilizes cases exclusively. For those

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students with limited educational backgrounds, the text and reference method opens up areas in which to continue self-improvement after returning to the job. Too slavish adherence to the text and reference approach, on the other hand, may result in theoretical shadow boxing. For this reason, considerable use is made of case material. Through the discussion of actual administrative problems, training is focused upon the use of knowledge and the development of judgment in its proper application.

Program purpose and content

Readers of this publication are aware of the fact that Department of Defense policy in the past decade has been increasingly oriented toward better management of the resources devoted to national defense. As a result of this policy, the Departments of the Navy, Army, and Air Force have adopted many of the techniques of administration that industry has been using for many years. It is for this reason most of the instructors have been drawn from business administration, industrial engineering, and the University Extension pool.

The extension of the comptroller concept within the Department of Defense is reflected in the content of two courses. Budgeting and Cost Control, a thirty-hour course, covers the two subjects appearing in the title along with an introduction to accrual accounting. The other tool course that falls within the comptroller approach is Statistical Analysis. Its purpose is to develop a practical working knowledge of statistical processes commonly used in administration and management augmented by a minimum amount of theoretical framework. Budgeting and Cost Control has been included in all programs while Statistical Analysis appears only in the Bureau of Supplies and Accounts program.

The Bureau of Aeronautics and the Bureau of Ships programs include a thirty-hour course in Time and Motion Study and another thirty hour offering in Plant Layout. These two courses are offered because of their relation to the kind of shore installations operated by these two bureaus. In the Bureau of Supplies and Accounts program,

students take a course in Supply Processing. This area of study traces the supply function through procurement, storage, materials handling, inventory control, order processing and traffic management. Its relation to the Bureau of Supplies and Accounts mission is obvious. Field trips to outstanding civilian counterpart activities are included as an integral part of these programs.

In addition to courses within the comptroller concept and courses within the area of specialization of the bureaus represented, each program also includes certain integrating courses. These are designed to develop well-rounded administrators and to improve human management skills. In the Bureau of Supplies and Accounts program these integrating courses include Organization and Administration, Human Relations, and Communication. In the Bureau of Aeronautics and Bureau of Ships programs, courses of this nature include Production Organization and Management and Human Relations.

In addition to the scheduled class work and the field trips, University Extension arranged evening meetings. The student group is polled on its preferences in various topic areas. Using the desires of the class as a focus, the Extension Division invites specialists to speak to the class about one evening a week. In addition, there is a "kickoff" dinner for each program which is attended by military installation management as well as a graduation ceremony at which the principal speaker is an authority on some phase of management.

At one time, trainees were required to work on a "project" as part of the program curriculum. However, the course of study is so concentrated and the time available for evening study is so limited that the project requirement has been dropped. In order to obtain an evaluation of individual performance students are now graded on a satisfactory-unsatisfactory basis.

Program and Participant Evaluation

The evaluation of a management development training program is always a very difficult task. The instructor, and that is the role of

the writer, occupies a unique position in these courses. There are a number of students in each class who display an increasing grasp of the subject matter as the program continues. For many participants the course provides an opportunity to explore areas that interest them but which they have had to defer due to lack of time. The participation and motivation that the course provides is different from that encountered on the job—here the opinions and analyses of the GS-7 are respected and valued equally with those of the GS-14.

The role of the participants in these programs is quite different from that of the typical university student. Trainees are expected to contribute to class discussion and this is considered as a factor in

Air Force Orders Aerobridge Loading Device

The old covered bridge, that symbol of horse-and-buggy days has an air-age offspring.

Lockheed Air Terminal officials today announced receipt of a contract to deliver to the U.S. Air Force a new cargo-loading device—called an Aerobridge—which resembles the familiar covered bridge of yesteryear.

Designed to speed cargo transfer between aircraft and airfreight terminals, the Aerobridge is a telescoping, hooded cargo and passenger ramp. It can be moved up, down, sideways or in and out to facilitate loading and unloading.

It effectively bridges the gap between aircraft floors and loading piers of varying heights, thereby eliminating the need for hoist trucks and double handling of cargo. (Airplane's wings normally prevent their being pulled close alongside docks.)

Self-propelled and portable (when knocked down), the Aerobridge is 64 feet long but has a telescoping extension which enables it to span distances up to 84 feet.

The bridge is supported by hoists mounted on movable dollies at either end. Each end of the span is independently adjustable between heights of 4 and 10 feet, so the floor of the bridge can be inclined in either direction—plane to dock, or dock to plane.

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grading their performance. When cases are discussed, the instructor may relinquish the podium to a student. During discussion periods students are at liberty to challenge the conclusions of the teacher. The environment is such that by the end of the course the student has acquired a questioning attitude, a broadened maturity, a forest rather than trees approach; call it what you will, the end result is an increased awareness of the role of the administrator in the management of the resources devoted to the national defense.

The following case study of trainee Bill Jones (of course that is not his real name) is illustrative of the changes in the values and attitudes of one individual as a result of participation in a six week management course. The writer had Bill as a student in a summer program and can vouch for the authenticity of the facts.

"Bill, age 49, started his career in the government service at the age of 19 by putting in six years in the Navy (two hitches). Changing a uniform for a pair of overalls, he started his civilian job as a helper just a month before the bottom fell out of the stock market. In '32 he became a laborer. In 1939, he began advancing up the promotional rungs as the Navy's civilian plant expanded. He hit each link as he proceeded up the chain—Leader, Leading-man, and Quartermaster; then, in 1944, he jumped to the top per diem job, Foreman.

"He was a hard and tough old supervisor and ran a tight shop. No one got out of line in his shop—at least, if anyone did, no one was around long enough for management to hear about it. Staff men kept clear of him. It was his shop and he wanted no one bothering him with personnel regulations or procedural studies. The officer in charge of his component described him as a stereotype of the old line civil service supervisor protecting his empire, come feast or famine. Management was working with Bill, and, although he did not show it, he was beginning to realize there was a need for change. He was

seeking to catch the spirit of progressive supervision.

"This was one of the men selected to attend the BuSandA sponsored U.C. course in Management of Supplies and Accounts. Has the investment paid off? Let's look at the record.

"At the course, he caught fire. His wealth of experience provided a spark to the group; the professors learned much from him. But he also learned. He found the fences he had built around his organization kept out more light than danger. He discovered that other supervisors had problems not unlike his own, and what's more—they had some of the answers he had been looking for! He began to see that it was not only easier but also more fun to be part of a larger 'gang' and to share his talent and his rich background of experience with his fellow managers.

"To quote his officer in charge, 'His outlook changed entirely. Because of his appreciation of what top management is after and because he came to recognize his role as a responsible member of the team, it was possible to assign him the full duties and responsibilities of Division Officer with no change in his title or pay. This led to the elimination of one LCDR billet in this function.'

"The following comments are pertinent:

"From the Officer in Charge—'He has been the one to suggest cuts in complement based on reduced workload. Before the course, his attitude was always that he had to have more people; now, he is trying to do a really good job with as few as possible.'

"From the Training Officer—'Now he is willing to listen. The course brought out latent skills.'

"From the Personnel Officer—'The course helped to mellow him. He is beginning to accept CSC rules and regulations as things he has to live with and to

apply intelligently; not things to get around. He now has a better understanding of what constitutes good personnel administration. He's not engaging in "swaps" and "deals." He is much more cooperative; easier to work with. He was pretty much a diamond in the rough. The course served to polish him and brought out his best qualities.'

"His own enthusiastic comment—
"Through the contacts made at U.C. course, I have been able to accomplish more in a year and a half than in all my other years with the Navy.'"¹

The above case study which could be repeated many fold indicates that those people who work with Bill, and he occupies a responsible position, are very much aware of the changes in his approach to his job. By his own admission he is a more capable and a more broadly oriented administrator than he was prior to the time he attended the program.

The production superintendent of a BuAer Overhaul and Repair facility pointed out that outstanding students in the summer programs are also the ones who do well in promotion examinations. Those few who look upon the program as a "six week leave with pay" are both poor students in the classroom and do poorly on promotion examinations. Fortunately, such people are in a minority and, if anything, most participants are so highly motivated that it is impossible to cover all the material included in a course outline.

"Alumni" of summer training sessions continue to meet socially during the year. More important, graduates of these programs have formed study groups to work on major projects at their home installations. Once the spark of intellectual curiosity has been aroused in them, it continues actively in their job environments. This helps to maintain the level of resource utili-

¹Operation Executive: A Report on a Navy-University Program of Management Development, U.S. Navy Bureau of Supplies and Accounts, Naval Supply Center, Oakland, California, Exhibit G.

zation at a higher level and undoubtedly pays off the cost of the program within a relatively short time.

Stewart-Warner Sets Up Engineering Scholarships

Stewart-Warner Corporation has announced establishment of 4 four-year engineering scholarships, three in mechanical engineering and one in electrical engineering, to be awarded to deserving high school graduates of exceptional ability through the National Merit Scholarship Corporation scholarship award program.

According to John M. Stalnaker, president of the National Merit Scholarship Corporation, the independent, non-profit corporation which has been set up with initial funds of \$20.5 million to devise and administer a nation-wide system of scholarships for higher education, Stewart-Warner is the third organization to announce participation in the new program by establishing specific scholarships. Previous scholarship contributors have been Sears-Roebuck Foundation and Time Inc. Stewart-Warner's action will release matching funds from the working funds of National Merit Scholarship Corporation for four additional scholarships, Mr. Stalnaker said.

Effective immediately, the four Stewart-Warner Merit Scholarships will permit four young men from among the 60,000 highly selected senior students who took the recent nation-wide competitive tests at 10,800 high schools to enter the engineering schools of their choice next Fall.

Contract to Study A-Power Transport Awarded by Army

Washington (AFPS)—A contract to determine how nuclear power might best be adapted to army transportation equipment used in land and water operations has been awarded to the Nuclear Development Corp. of America, White Plains, N. Y.

Maj. Gen. Paul F. Yount, army chief of transportation, described this contract as "an expeditious means of determining the technical, economic and military desirability" of nuclear powered transportation equipment.

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The study will include certain rail locomotive equipment, several types of army harbor and inland waterways craft and special large cargo-carrying land vehicles.

The Army said it considered the application of nuclear power to the field of military transportation one of great potential and it would "materially assist in attaining the degree of strategic mobility required for modern warfare."

The \$100,000 contract was awarded by the Army Transportation Research and Development Command, Ft. Eustis, Va.

Artificial Ear Developed At Corps of Engineers Research Laboratories

An "artificial ear" for measuring acoustical response of headsets in the laboratory has been developed by Corps of Engineers Research and Development Laboratories, Fort Belvoir, Virginia.

So simple in design that it does not require a specially-trained man to operate it, the new device also provides for reliable testing and evaluation of earphones in production.

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How to Use Armed Forces Management's Library—

Inserted in this issue, a postage free card is provided for your convenience in requesting descriptive and informative literature. This will be forwarded to you, without obligation. Many cost saving ideas are generated by Operating Departments that have referenced information on products available. Purchasing Officials will find this type of information invaluable. All that need be done is: fill in name and address, circle that which will assist you, and drop in the mail.



NEW .22 AUTOMATIC RIFLE

Browning Arms Company. (See Cut). A new .22 automatic rifle, another addition to the Browning line of guns, has recently been announced by this time-honored manufacturer. Moderately priced, the new gun offers many advantages before unknown. Owing to the simplicity of its mechanism, it can be cleaned easily and quickly. Attractive French walnut, fine hand checkering, and careful fit of wood and metal give each model the characteristic Browning finish. The low price will surprise each of you who request available information without obligation.

For more facts request No. 1 on reply card

THERMO-PANEL PLATE COIL

Dean Products Incorporated. (See Cut). Thermo-Panel is a plate coil heat exchange surface that takes the place of pipe coils in industrial heating and cooling processes.



It consists of two plates having suitable embossings and welded together to form the necessary flow channels. Available in various metals, sizes and shapes, it fits many military applications. A new bulletin No. 355, available to interested individuals and organizations, treats in some detail the special features of this equipment.

For more facts request No. 2 on reply card

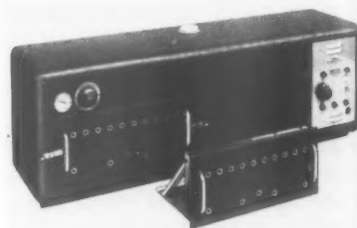
ELECTROFAX DRY- PHOTOGRAPHIC ENLARGER

Radio Corporation of America. A new type of dry-process enlarging printer, capable of reproducing fifteen standard-size engineering drawings a minute from microfilm originals, has recently been announced by RCA. The high-speed, automatic enlarger-printer, which is expected to revolutionize the storage and reproduction of vital engineering drawings, is the first commercially designed machine to utilize the RCA-developed Electrofax dry-protographic process.

For more facts request No. 3 on reply card

TEMPERATURE TEST CHAMBER

Statham Development Corporation. (See Cut). This new model TC-2A, completely portable low-cost unit (\$550) was especially designed for production line tests of



small products. Features include the new anticipator-type thermostat, three-heat selection switch, rugged aluminum construction and glass fiber insulation. Quick to be accepted by the military, complete information is available without obligation.

For more facts request No. 4 on reply card

CONSTANT-SPEED OIL-HYDRAULIC AIRCRAFT MOTOR

Vickers Incorporated. A new line of constant speed motors with integrated anti-overflow flow control is now available for use in aircraft oil-hydraulic systems from Vickers. With the constant speed motor operating under overrunning load, the unique integral flow control positively prevents uncontrolled runaway action or overspeeding of the motor in the event of cavitation. The flow control also provides constant speed drive for either direction of motor rotation.

For more facts request No. 5 on reply card

A SYMPOSIUM OF TECHNICAL ARTICLES

Borg Equipment Division, Borg Corporation. A symposium of technical articles is offered to interested individuals by the George W. Borg Corporation, without obligation. This interesting and informative 15-page document contains a wealth of material in the electrical engineering field.

For more facts request No. 6 on reply card

ALL PURPOSE FLUSHING GUN

Miller Sewer Rod Company. A new all purpose flushing gun which will clean all pipelines of obstructions,

ARMED FORCES MANAGEMENT

corporation. Easy to operate, it delivers a hammer blow at the squeeze of a trigger freeing any stoppage regardless of sharp turns in the drain. This low-cost gun can solve your installation problems and pay for itself in one application. A catalog No. 980 Plumber's All Purpose Flushing Gun Complete with Air Pump and instructions is available on request.

For more facts request No. 7 on reply card

REMOTE CONTROLLED DICTATION MACHINE

Felt & Tarrant Manufacturing Company. A new machine to meet today's automation minded offices has recently been announced by Comptometer Dictation Division of Felt & Tarrant. This electronic achievement, The Commander, virtually obsoletes the necessity of having any dictation equipment except a microphone on the executive's desk. New improvements too numerous to list, make your investigation of this revolutionary machine a necessity for good management. Complete descriptive information is available without cost.

For more facts request No. 8 on reply card

SILENTAIR SCREWDRIVERS AND NUTSETTERS

Thor Power Tool Company. A new kind of air tool that reduces exhaust noise by 75% has recently been manufactured by this organization. Proven to sharply reduce fatigue factor for everyone within earshot, the SILENTAIR was designed to allow full advantage of light-weight, extra-power equipment with increased efficiency in operation. Thor Power Tool Company offer to make a demonstration at your installation without any obligation to prove the wonders of their new equipment. In addition, a complete descriptive folder is available for you to better understand their product.

For more facts request No. 9 on reply card

TEETER SOLVENT STILL

Tect Incorporated. A completely automatic still for reclaiming solvents has been developed and is available through their distributor organization. The device described as a "Teeter Still," since it operates on a unique principle of maintaining the correct operating level without float type controls, has received

wide acceptance in industrial tests. The model 82 which may be set up in any plant or installation, distills 5 to 7 gallons of solvent per hour at an operating cost of approximately 2c a gallon. Savings up to 75% have been reported with this cleaner. Fill out the inclosed product card today for full information on how dollars may be saved at your organization.

For more facts request No. 10 on reply card

RADIO PAGER

Motorola Communications and Electronics Corporation. A small pocket size radio paging receiver that calls personnel selectively has been developed by Motorola. For use with a central system located at an installation, the system permits equipped personnel to be called and to hear a voice message from the caller. The portable receiver weighs 10 ounces and is transistorized. Battery life has proven to be about 40 weeks, and up to several hundred persons per system can be paged individually. Operation is possible without FCC license. More descriptive information is available on request.

For more facts request No. 11 on reply card

STREAMLINED UTENSIL WASHER

Food Machinery and Chemical Corporation. A corner of the commercial kitchen that no one particularly cared to show—the pot and pan washing section—can now be as modern and shining as any other. The new streamlined FMC Utensil Washer is stainless steel and designed to sharply reduce operating costs. Everything from pie pans to garbage cans can be washed and rinsed "greaselessly clean" in a complete wash-rinse cycle of 2 minutes or less. In every installation, very substantial savings in labor, detergent, and time have been reported. Complete descriptive information on the new Model 202 will show you how first you can buy this fabulous machine, and how it will completely pay for itself within a short period of operation.

For more facts request No. 12 on reply card

DAY-GLO MATERIALS

Switzer Brothers. Supplies the Armed Services with daylight fluorescent paints, fabrics and other high-visibility color materials as

PRODUC-TROL Visual Control

not only schedules,

But automatically checks
with TIME, LINE
and COLOR control



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- Schedules and time checks operations.
- Historical record to back it up.
- Bad situations show automatically.
- Its simplicity has put it into world-wide use.
- Analyze 100 items in 10 seconds.

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Westport, Conn.

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well as finished articles in the vivid Day-Glo colors. These are many times brighter and purer than ordinary colors, and thus facilitate identification, safety, signaling and similar operations in which long-distance or instant color recognition is a critical military factor. Suppliers of materials used as paulins, flags, air-ground recognition panels, channel buoys, tow targets and guided missiles, Switzer also supplies decals, phosphorescent tape, black lights and other luminous combat and training aids. Color charts and descriptive information is available.

For more facts request No. 13 on reply card

MOTOR-DRIVEN MICROMETER

J. W. Dice Company. Direct measurements accurate to 0.00005 in. or better, independent of any human variable in sensing contact or setting the dial, are obtained with this new Model H Carson-Dice motor-driven electronically controlled precision micrometer, made by J. W. Dice Company. It

is a true screw-thread measuring instrument and *not* a comparator. The actual dimensions of any electrically conductive part are read directly on a 3-in. dial with widely spaced dial divisions for each 0.0001 in. Operation is automatic and high speed; after placing work on anvil, operator merely presses a small button at the left of the anvil; built-in motor brings the micrometer to the precise point of contact with work at a rate several times the speed of the best operator. At the instant a setting is completed a green light glows under the index window. Automatic control is so sensitive and rapid in response that the micrometer is stopped before any pressure is exerted by the micrometer on the work. Measurements therefore can be made on fragile or flexible parts such as radio tube grids with the same speed and precision as for rigid parts.

For more facts request No. 14 on reply card

NEW INDUSTRIAL VITAMIN SUPPLY SERVICE

East Vitamin Products Company. A new multi-vitamin capsule available in bulk quantities designed specifically for "on the job distribution" as a management service, has

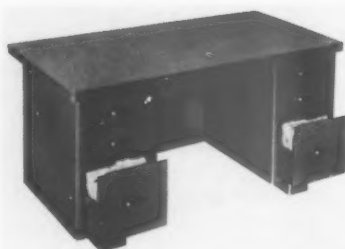


recently been announced. A supplement to necessary vitamins in daily diet, they help to keep workers fit, and capable of resisting colds, minor ailments, and fatigue.

For more facts request No. 15 on reply card

STEEL DESKS

General Industrial Company. (See Cut). Production of a new streamlined desk, 54"x24" of heavy-duty 20 and 22 gauge steel con-



struction, beautifully finished in a durable, silver-grey baked enamel has recently become available from General Industrial Company. The truly remarkable thing about this new fine desk is the unusually low price of just \$59.50 F.O.B. their New York Plant. Here at last is a steel desk, engineered for long trouble-free use, cheaper than a refinishing cost on the average desk in use. Noted for their long line of office equipment, General Industrial will be pleased to send your installation their new catalog without obligation.

For more facts request No. 16 on reply card

SUBMINIATURE GYRO COMPASS

American Bosch Arma Corporation. A new illustrated booklet, 24 pages, 8½x11", describes the world's most accurate true-north-seeking gyro compass suitable not only for ships of all sizes and classes, but also for all types of land and amphibious vehicles. It can also be modified for use in light planes, fighter aircraft and helicopters... has been successfully operated in flight.

For more facts request No. 17 on reply card

STREET AND RUNWAY SWEEPER

Wayne Manufacturing Company. Does your installation have a problem of keeping dirt and debris from runways, production areas and streets? The new Wayne Model 550 is the "big brother" to the famous Wayne Model 450 in use by many installations. Designed with jet aircraft operation in mind, the new Wayne 550, can pay for itself in maintenance costs to engines which like a magnet, pull into air intakes objects on runways and taxi-strips. Multi-purpose in design, the Wayne 550, is a year-round piece of equipment and is used with excellent results in light snow removal. Offering for the first time without extra

cost, power steering, power brakes, inside broom adjustment, the Model 550 is powered by a 148 h.p., V-8 industrial type engine. Complete descriptive information is available on this dollar-saving equipment.

For more facts request No. 18 on reply card

COUNTER-TYPE BEVERAGE DISPENSER

C.T.C. Manufacturing Corporation. The new 1956 model called the "Whirlpool," is the latest non-carbonated, counter-type dispenser available. Manufactured in two sizes, the 9 to 12 gallon Whirlpool Sr., and the new Jr., with 6 to 8 gallon capacity, it contains no seals or shafts, guaranteeing no leaks. The dispenser stands 27" high with an illuminated translucent dome, manufactured in stainless steel throughout for economy and appearance. We shall be pleased to send you more specific information, prices and specifications.

For more facts request No. 19 on reply card

LIGHTWEIGHT HYDRAULIC LIFT TRUCK

Hydralift Incorporated. A lightweight hydraulic lift truck which weighs but 50 pounds yet capable of lifting a 500 pound load to a height of 49", is available from Hydralift. With the light aluminum construction and low cost, it is now possible to have several available at the motor pool enabling one man to do the loading formerly requiring two or three individuals. Management-minded operators can visualize the tremendous savings possible with this man-saving equipment. May we send you more information on this new equipment with the many safety and operating features?

For more facts request No. 20 on reply card

TACHOMETER TAKEOFF HEADS

Metron Instrument Company, these Tachometer Heads (Series



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33), used with Metron Indicators, measure high speeds—5000 to 30,000 RPM—or low speeds— $\frac{1}{2}$ to 100 RPM. Rugged construction gives extremely long life under continuous industrial operation. No brushes, slip rings or other parts that need regular maintenance or replacement are used. Available for quick delivery now.

For more facts request No. 21 on reply card

NEW DIESEL MOTOR GRADER

Allis - Chalmers Manufacturing Company is introducing the Model D Diesel motor grader with a new Allis-Chalmers 6-cylinder, valve-in-head Diesel engine rated at 50 brake max. h.p. at 1625 rpm. The Model D motor grader will con-



tinue in the line with gasoline engine.

The new Diesel engine has a 37/16-in. bore and 4 $\frac{1}{2}$ -in. stroke, and 230 cu. in. piston displacement.

Direct electric starting on Diesel fuel is provided by a 12-volt starting system. Incorporated in this new engine are features such as replaceable wet-type cylinder liners; bypass cooling system with high capacity water pump; pressure lubrication; aluminum alloy pistons; simple, easily serviced fuel injection system; and four filters to assure clean fuel.

For more facts request No. 22 on reply card

BELCO REPLACEMENT FAUCET STEMS

Miller Manufacturing Company. Leaking compression type faucets, lost water and excessive maintenance costs are gone forever with the installation of Belco ball bearing replacement stems, complete with bibb washers. To insure perfect replacement, stems are made to order from a sample sent in by

the purchaser—housing authority, military installation or institution. Stems include the Belco valve seat unit. The moment the rubber faucet washer contacts the seat its turning action stops and the ball bearing takes up the load, exerting non-turning pressure on the washer seat. The bibb washer is only under compression and is not subject to cutting or grinding action.

For more facts request No. 23 on reply card

VISUAL MANAGEMENT CONTROL

Graphic Systems. This New York firm invites men interested in efficient management to get things done with Boardmaster Visual control which gives a graphic picture of operations, spotlighted in color, saves time, money, and stops errors.

For more facts request No. 24 on reply card

COMMON STOCK INVESTMENT

Hamilton Management Corp. Through Hamilton Funds, Inc., a managed common stock investment fund, this firm offers lump sum or monthly investment plans to fit any budget. Interested persons can inquire without obligation. Firm recently declared another quarterly dividend.

For more facts request No. 25 on reply card

ALL-PURPOSE HAT AND COAT RACKS

Vogel-Peterson Company. Snap-over hooks to replace hangers give double capacity in same area. Checkerette racks can be set up or taken down in a minute without nuts, bolts, or screws, are strongly built of welded heavy gauge steel.

For more facts request No. 26 on reply card

VISUAL CONTROL BOARD

Wassell Organization, Inc. Product not only schedules but automatically checks with time, line, and color control, has low original and upkeep cost.

For more facts request No. 27 on reply card

GOVERNMENT INSURANCE

Government Employees Insurance Company. Complete protection on automobile insurance plus savings over standard rates of up to 30% are available from this firm. Unexcelled claim service and nation-wide protection are offered by this firm with over a quarter mil-

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lion policyholders. The savings and protection are for government employees and armed forces personnel.

For more facts request No. 28 on reply card

MUTUAL INVESTMENT FUND FACTS

Brown, Madeira, and Company. This company, specializing in mutual investment funds, will send, without obligation, facts about conservative, middle-of-the-road, and aggressive types of investments and mutual funds.

For more facts request No. 29 on reply card

EFFICIENT SIRENS FOR MILITARY VEHICLES

Federal Sign and Signal Corporation. Specifying Federal sirens, available in 6 different classes and 34 different models, will insure procurement of an efficient signal and adequate warning device for military vehicles.

For more facts request No. 30 on reply card

U. S. Marines were called upon to quell a riot in Massachusetts State Prison in 1824.

Organization of the Universe

by Weldon T. Ellis, Jr.

ABOUT FOUR thousand years ago it was written that, "In the beginning God created the heavens and the earth." (Genesis I). Since that time man has added little to his positive knowledge as to how the universe started. He has, however, been able to gain insight into segments of what might be called the *process* of creation. Some of these represent tremendous accomplishments by outstanding men in the field of science and philosophy, such as Galileo, Newton, Kant, Eddington, LeMaitre, Riemann, Hubble, Jeans, Darwin, Planck, Bohr, Einstein, Faraday, Shapley, Gamow, and others.

From them have come such con-

cepts as the movement of the heavenly bodies, the interaction of forces, the pulsating universe, the primeval atom, the curvature of space, the electromagnetic field, the quantum, relativity, the creation of matter, the composition and organization of the galaxies, the evolution of the species, and the behavior of the atom.

None of these, however, gives a clear understanding of *how* the universe was created. Individually none seems to answer the age-old riddle of the finite versus the infinite, nor do they collectively satisfy man's curiosity about creation. Perhaps in total they offer us a broad-brush picture of how the process of creation has continued once it started, but let's see how the products of many minds, each viewing the universe from different aspects, may supplement each other.

As a point of departure, consider George LeMaitre's concept of the universe as having been created from a "primeval atom." Perhaps a better term would be a "mother molecule," containing a *mixture* of all the elements. In this concept, the mother molecule is the *hub* of a finite universe, suspended in the infinite of a finite universe and slowly rotating back and forth. Except for size and rate of oscillation this may be likened to the escapement movement of a watch.

If viewed from afar, little would seem to be taking place. This is an unrealistic picture. Gradually, in finite terms, but rapidly in infinite terms, the "mother molecule" increases in size much like a growing crystal. It increases mass through its accumulation of "cosmic dust" and free energy. As it grows, its rate of spin decreases; as its size increases, so does its density.

During the growth, of this "mother molecule," the process of

atomic regeneration, or the *creation* of matter, is taking place—a regenerative process described by George Gamow and Fred Hoyle.

Once this process is under way, it is completed, according to Gamow, in the matter of a few minutes. The varying density of the mother molecule is roughly equivalent to the atomic weight of its elements. In a process of this magnitude there is no uniform pattern of distribution, but rather a general pattern of increasing density from hydrogen, or the lightest element on the outside, to whatever might be the heaviest element at the core.

According to the author's hypothesis, it is at the point in time of maximum density and growth of the mother molecule that the cosmic explosion occurs. Here is both fusion and fission, the beginning of the *creation of space*, both within each atom and among the heavenly bodies. It is the start of the *expanding universe* as portrayed by Sir Arthur Eddington.

The author holds that this truly cosmic explosion does several things. First, it would fling outward in tremendous quantities regenerated masses of atoms. These masses would continue to split and spread outward in a series of spinning explosions—a giant heavenly fireworks display. This would continue until relative stability had been reached. Second, the force of the explosion would reverse the direction of spin of the hub, which is all that would remain of the mother molecule. Third, it would impart tremendous rotational velocity to the hub. Further, it would create a void at the center of the cosmos—like the "vacuum" created in the atmosphere by the passage of lightning. In this concept, these events represent the birth of a new ring of super-galaxies.

EXPLANATORY COMMENTS

on

"ORGANIZATION of the UNIVERSE"

The enclosed article offers what the author believes to be a tenable hypothesis covering the organization of the universe. No proof can be offered as to its validity; nor can the argument be used that, if no violence is done to proven theories and if seemingly contradictory views are rationalized, it is a valid framework. The hypothesis appears to be at least a possible one. Insofar as the author has been able to ascertain, there are no violations of fact or theory.

The author is currently employed as Deputy Director of Manpower and Organization of the United States Air Force. Prior to this he held positions pertaining to management of the Federal, State and local governments. He has also served on various special committees dealing with the organization of governmental and civic endeavors. He holds degrees in engineering from the Virginia Polytechnic Institute and a degree in architecture from Harvard University. He is a member of Tau Beta Pi, a national honorary engineering fraternity and is a professorial lecturer on management at George Washington University.

Let us assume for the purpose of this hypothesis that the universe is composed of a series of concentric rings. Each ring is made up of a chain of super-galaxies. The pattern of the super-galaxies is being plotted by the astronomers with both optical telescopes and radio wave emission observations. The concentric structure of super-galaxies is, however, pure conjecture. Each super-galaxy is made up of a large number of galaxies, such as the one of which our solar system is a part. Most of these are spiral in form, though their pattern at birth and relative stage of development would vary. From this we may assume that our universe might have the same spiral form as our galaxy. The super-galaxies are not only in concentric rings, but they also radiate outward in a series of spiral arms, like spokes from a hub.

This universe would then be the sum total of all matter, energy, space, time and life. It is creation. We see at the center the hub of the mother molecule. The rings of super-galaxies radiate outward in a series of waves. Near the center they are relatively small, compact and close together. The elements of which they are composed would be toward the heavy end of the atomic table. They would be in the main, highly radio-active. The fierce releases of energy would create terrific internal stresses and friction. Here, then, would be creation at its most elemental level.

Outward from the center a change would gradually take place. As the galaxies moved outward they would expand in all directions at once. This is the expansion that causes the shift to the red end of the spectrum of the light reaching us from the stars. It is the shift first observed by Edwin P. Hubble and now largely accepted as connoting an expanding universe.

In addition to the expansion of the galaxies and their planetary systems, another form of expansion would take place. As the galaxies expanded there would be a continuing, pulsing radiation of energy from the regenerated atoms. This *energy release* would add to and help maintain the initial impetus of expansion given by the atomic explosion. As atoms release energy

and particles of matter they too must expand. This atomic expansion is essential to the maintenance of a dynamic balance between the nucleus and the electron shells. As they expand the planets also must expand. In other words, the expanding universe, in this concept, is not limited to the movement outward from one another of the larger units such as the galaxies. In progressively decreasing rates expansion would be carried down through the planets and the atoms to the smallest unit of all where matter, energy, space, and time are synonymous. The smallest unit is ylem, the basic building block of the universe. Combined in one form it is energy, in another it is matter. Ylem is the common denominator between matter and energy. It, too, must expand as the universe grows. If this were not so, this universe would lack continuity.

As the galaxies expand outward they would, in this concept, become more tenuous as they lost energy content, or as entropy* increased. In a like manner the planets and the atoms would become more tenuous. At the same time that the rate of expansion would increase, the process of electromagnetic alignment would take place. Initially the atoms would be highly charged on the one hand and diversely oriented on the other. As the galaxies moved outward they would release energy. This released electromagnetic energy, though lost to the galaxy, would not be lost to the universe. It would tend to flow backward toward the center of the universe as the galaxies moved outward. As the atoms released energy they would lose mass and thus would have a lesser individual internal stability. This would result in a compensating gain in overall stability because the direction and rate of nuclear spin of all the atoms tend to synchronize and create a

more harmonious pattern. In other words, an orientation of atomic and molecular structure would take place. This is to a degree, similar to the internal alignment that takes place when a piece of iron is magnetized; it creates a lessening of internal friction and permits a more rapid expansion and growth.

In contrast to the slowing down of the mother molecule, each galactic ring would build up in rate of spin and expansion as it moved outward. This movement and build up in spin would not be a smooth one but would vary according to the initial composition of elements, the impulse given by the original explosion and subsequent internal adjustments. The impact of internal disruptions, plus the transmitted impact of subsequent cosmic or central explosions would create a wave-like or pulsing effect. This is a significant component of the contracting and expanding universe, as described by R. C. Tolman. This pulsating effect would therefore be transmitted down into and be maintained by the pulsing releases of energy from the atoms plus the shimmering resonance of the ylem itself.

As entropy increased, the amplitude and frequency of the pulsing would change. The explosion at the center would create tremendous, almost overpowering pulsations. These would create waves that would cause compression and rarefaction of the galactic rings themselves. In other words, the pulses would be clearly defined and quantified on a cosmic scale. The amplitude would be tremendous but the frequency would be low. Further from the center the amplitude would gradually diminish like the ripples from a rock dropped in a pool. Paralleling the decrease for amplitude would be an increase in frequency proportionate to the increase in rate of spin and expansion of the galaxies and atoms.

As the galactic rings expanded outward they would pass the point of maximum rotation and start to slow down in their drive to attain maximum growth. At the same time the pulsing flow of energy outward from the atoms and inward toward the center of the universe would continue, but at a lesser rate. In other words, as each ring ap-

*Entropy is defined as the availability of energy to do work in a thermodynamic system. The increase in entropy is thus proportional to the release of energy and must be measured in relation to the loss from a given system. For example, the release of energy from the sun means an increase in its entropy. The process of photosynthesis converts some of this energy back into matter. The availability of the energy decreases the entropy of the earth.

THE MOTHER MOLECULE & GALACTIC RINGS

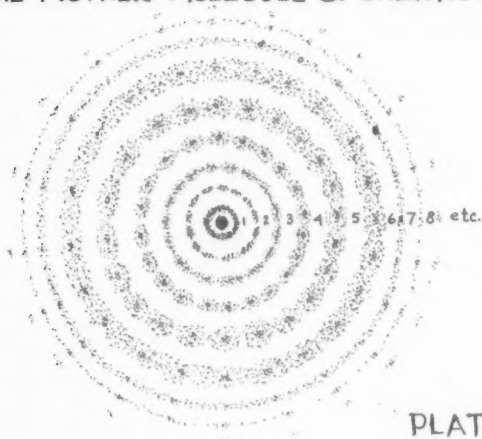


PLATE I

proaches the outer edge of the universe it would tire and slow down.

The outer and most attenuated galactic ring would then begin to disintegrate and dissipate into "cosmic dust." It would then, in this concept, form the outer shell of the universe beyond which there is neither matter, energy, space, time, nor life. In a positive sense nothing would exist beyond our universe unless one wishes to conceive of a series of similar island universes. If so, then each would be following a similar pattern of life and death with perhaps a periodic grand death and rebirth of the totality of the island universes.

When the outermost galactic ring reached the point of maximum expansion it would then be ready for regeneration. By then it would have become more like the outer shell or crust of a huge discus rather than a ring of dynamic galaxies. It would have become an empty crust of atomic shells, the antithesis of the surging, pulsing, driving, force it was at the beginning of its life cycle. At this stage its internal energy or ylem would have been largely expended. Instead of being composed of the heavier elements, it would now be made up of the lighter ones. This galactic ring would be virtually dead and entropy approaching one hundred percent.

At this stage of development of the outer galactic ring, a central cosmic explosion would take place. As stated earlier, the central explosion would create a void around the remains of the mother molecule

and cause a reverse spin on its axis. The combined void and spin would literally drag the outer shell of spent atomic debris in from the periphery of the universe. While this is happening, the inward stream of released energy or ylem would flow into the void created by the central explosion. The two streams would converge to repack, rewind, recompress and thus re-energize the atoms of the spent galactic ring. This would continue until it once more became a part of the mother molecule. This union would be complete when a critical mass was created and a cosmic explosion occurred. The child would be cast forth to become again a galactic ring and begin anew its life cycle.

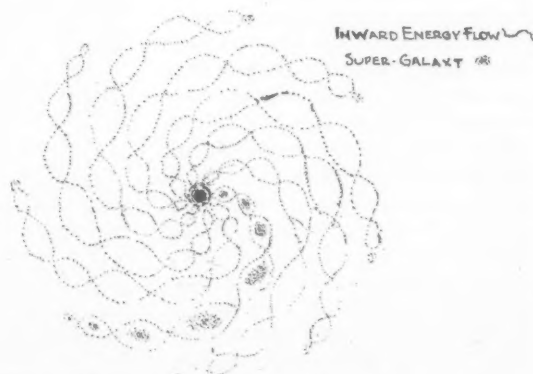
Thus it can be seen that the process of creation would consist of a continuing replacement of the centermost galactic ring by a new one—or a regenerated old one. The former central ring would be

pushed outward by the force of the explosion. The numerical order of the rings would be changed each time a ring would be regenerated. The first would become the second, the second the third and so on. In this way regeneration would be the prime mover in a continuing process of re-creation.

The above is the ultimate application of the Newtonian principle that for every action there is an *almost** equal and *almost** opposite reaction. The action of the birth of a galactic ring would create a reaction throughout the universe that would help hasten the evolution and development of the rings previously born. At the same time the void it created would help regather the outermost ring so that it also would be reborn. The repetitive cycle of the universe is thus one of birth and death in all of its components. This birth and death process is one that continues throughout the entire life cycle of each galactic ring.

The concept of the curvature of space was first enunciated by Bernhard Riemann and was later elaborated upon by Albert Einstein. In the author's hypothesis, the creation of space would occur both within the atoms and among the planets and galaxies. The release of energy, i.e., the decrease in mass of the atoms, would cause a diminuation in energy content to the point that a relative void or space would be created. The released energy would

*The word "almost" has been added by the author. If the actions and reactions were exactly equal and opposite this would be a static universe.



SPIRAL PATTERN OF THE UNIVERSE

PLATE II

help fill the void among the planets and expand the galaxies. The expansion of energy to become ylem and the further expansion of the ylem would thus create space external to the atoms. Essentially space and ylem are synonymous. Matter, energy and space are merely different aspects of ylem.

The curving backward toward the center of the universe of the flow of ylem would represent true curvature of space. There could also be considered to exist curvatures of matter and energy as component parts or sub-curvatures of space. The curving flow back to the center of the universe, of the debris of evolution, would be in the nature of a continuous sloughing-off process. The rate of expansion, loss of energy, disintegration and flow back would all be proportional to the distances from the center of the universe of the galactic ring and of the galaxies from the center of the galactic ring. That is, those galaxies on the periphery of a galactic ring, particularly those nearer the "edge" of the universe, would tend to expand at a faster rate than those nearer the center of the ring. In other words, as a galactic ring progressed outward there would be a gradual peeling off and flow back to the center of the outer atomic waste and released energy. In this manner the outermost portions of one cycle would reverse their positions and become the innermost of the next cycle.

The flow of energy through matter would create time. The energy flow would help keep the cosmic clock wound and the atomic nuclei would provide the governors that would help regulate its speed. The faster the flow of energy, the faster the rate of vibration and nuclear spin of the atoms and the faster time would pass. To put it differently, the greater the amount of energy used the greater the amount of time that would be used. In other words, within limits, time and energy are interchangeable just as are matter, energy and space. The impact of an abnormal rate of flow of energy through matter would speed up the ageing process. Conversely, an abnormally fast rate of passage of matter through the cosmic energy flow would produce turbulences and finally create a

drag on the flow of energy through the matter. The piling up of this energy would create greater mass that would at the same time tend to retard faster speed. In this way, both extremes—the very slow flow of energy or the extremely rapid passage of matter—would have the same effect, namely a slowing down of the relative time passage. Time would thus be a fourth aspect of ylem and the result of its interaction with energy and matter.

To summarize the relationships established by this hypothesis: the fundamental building material of the universe is ylem; ylem can take two basic forms, matter and energy; matter is ylem in a relatively compact or static form; energy is ylem in a relatively free and dynamic form; space is ylem in a relatively expanded form and time is a function of the periodicity or rate of vibration of ylem. Although all the aspects of ylem are closely interrelated and changes in one automatically effect changes in the others, the aspect of space is most closely related to matter, and that of time to energy. Since the various aspects are, within limits, interchangeable, and one affects the other, an abnormal change or distortion in one inevitably creates a distortion in the others.

The above shifting of ylem from one form or state to another would be based on the simple pattern of the pulse or vibration. This is essentially a repetitive or cyclical pattern that would account for the regeneration of the components of the universe and of the universe itself. The apparent complexity of the universe would stem from the multiplicity of interactions involved rather than from the nature and

CROSS SECTION
THROUGH THE GALACTIC RINGS

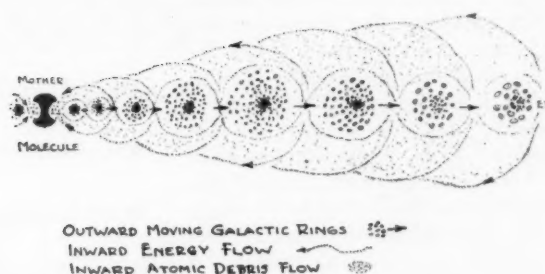


PLATE III

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One of the unresolved mysteries facing man was the interrelation between electromagnetic and gravitational forces. Einstein's Unified Field Theory tells us that the electromagnetic and gravitational forces are interdependent aspects of a basic universal field. Let us therefore explore the application of the concept of a unified field to the author's hypothesis and see if there is any conflict.

Basically, this hypothesis presents the universe as being composed of vibrating ylem combined in various forms to appear at one stage as matter at another as energy and so on. The universe can be likened to a vast drop of water with bits of material suspended in it. The bits of material are being moved about by the convection currents flowing within the drop. In this hypothesis an electromagnetic field composed of ylem has been substituted for the drop of water. The bits of matter have become the planets and galaxies suspended in that field and energy flows in the universal electromagnetic field would be substituted for the convection currents.

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THE MOTHER MOLECULE & GALACTIC RINGS

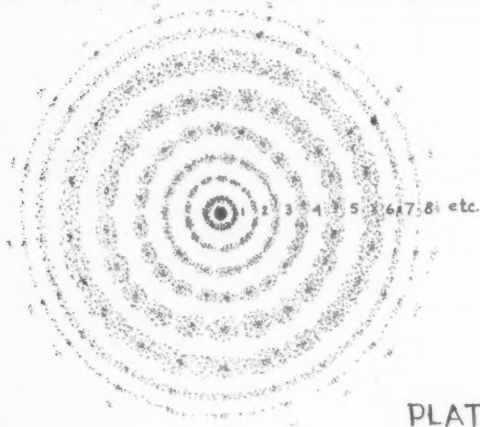


PLATE I

proaches the outer edge of the universe it would tire and slow down.

The outer and most attenuated galactic ring would then begin to disintegrate and dissipate into "cosmic dust." It would then, in this concept, form the outer shell of the universe beyond which there is neither matter, energy, space, time, nor life. In a positive sense nothing would exist beyond our universe unless one wishes to conceive of a series of similar island universes. If so, then each would be following a similar pattern of life and death with perhaps a periodic grand death and rebirth of the totality of the island universes.

When the outermost galactic ring reached the point of maximum expansion it would then be ready for regeneration. By then it would have become more like the outer shell or crust of a huge discus rather than a ring of dynamic galaxies. It would have become an empty crust of atomic shells, the antithesis of the surging, pulsing, driving, force it was at the beginning of its life cycle. At this stage its internal energy or ylem would have been largely expended. Instead of being composed of the heavier elements, it would now be made up of the lighter ones. This galactic ring would be virtually dead and entropy approaching one hundred percent.

At this stage of development of the outer galactic ring, a central cosmic explosion would take place. As stated earlier, the central explosion would create a void around the remains of the mother molecule

and cause a reverse spin on its axis. The combined void and spin would literally drag the outer shell of spent atomic debris in from the periphery of the universe. While this is happening, the inward stream of released energy or ylem would flow into the void created by the central explosion. The two streams would converge to repack, rewind, recompress and thus re-energize the atoms of the spent galactic ring. This would continue until it once more became a part of the mother molecule. This union would be complete when a critical mass was created and a cosmic explosion occurred. The child would be cast forth to become again a galactic ring and begin anew its life cycle.

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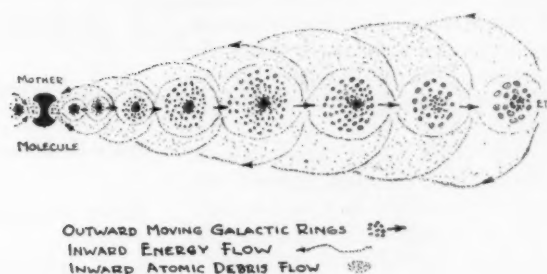


PLATE III

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In this concept matter is presented as being quantified in in-

creasingly larger units. These start with the subatomic particles, neutrons, protons, etc., which combine to form atoms. The atoms combine to form molecules and these, the planets. Next are the solar systems with the planets circling around the suns. These form the galaxies which form the super-galaxies which are grouped around the mother molecule in galactic rings. The sum total is our universe. The question of additional universes is not germane to this hypothesis.

Energy is also considered to be a series of vibrations, pulses, waves, or cycles of varying orders of magnitude depending upon the order of magnitude of the units of matter involved. In other words there is a fundamental relationship between matter and energy that extends beyond the conversion of mass to energy. The pressures created by the vibrating energy patterns are, according to this hypothesis, the forces that bind the universe together.

The energy pattern starts with shimmeringly vibrant waves in the field of ylem if not with the vibration of ylem itself. It builds up to include the cosmic rays, electrons, radio waves, light, heat, sound and so on to include the massive, undulating wave patterns of the galactic rings, created by the initial explosion of the mother atom. The components of this spectrum of vibrations are interdependent upon each other. In turn, the reaction or relative resonance of the matter spectrum also affects both the frequency and amplitude of the components of the energy spectrum.

In one sense, the universe can be pictured as a shimmering field of ylem supporting a wide range of corpuscles of matter kept in motion by an equally wide range of interacting energy vibrations. This immediately leads to the possibility of opposing vibrational patterns. At times these would dampen and at other times reinforce each other depending upon the phasing and relative amplitude and frequency of the interacting vibrations.

The application of the hypothesis to the concept of gravity brings out some interesting possibilities. Consider first the world as being suspended in an expanding field of vibrations, i.e., an expanding elec-

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tromagnetic field. This field would press upon the world from all directions. The pressure would vary according to the intensity of the field and the releases from the other planets. In one sense this external pressure upon the world could be considered as an inward pull toward the earth. In other words, this pressure would be the "force of gravity" which acts by *pushing* objects toward the earth instead of *pulling* them, as is usually considered in the classical concept of gravity.

Concluded Next Month

Scientific Advisory Board For Missiles Formed By Fairchild

Edwin A. Speakman, vice president of the Fairchild Engine and Airplane Corporation, announced

the formation of a Scientific Advisory Board for the Fairchild Guided Missiles Division. The board is composed of outstanding scientists for the purpose of advising on the planning of research programs and the development of new techniques in the field of guided missiles, electronics and atomic energy. The following are the members of the board: Dr. Eric A. Walker, dean of the College of Engineering, Pennsylvania State University, University Park, Pa.; Dr. Robert F. Rinehart, professor of mathematics, Pace Institute of Technology, Cleveland, Ohio; Dr. Walter E. Albertson, professor of physics, Naval War College, Newport, R. I.; Dr. Richard M. Emberson, assistant to the president, Associated Universities, Inc., 350 Park Avenue, New York, New York.

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